

Phosphorus Regulations

National Implementation Report, 2003



Environmental Protection Agency

Establishment

The Environmental Protection Agency Act, 1992, was enacted on 23 April, 1992, and under this legislation the Agency was formally established on 26 July, 1993.

Responsibilities

The Agency has a wide range of statutory duties and powers under the Act. The main responsibilities of the Agency include the following:

- the licensing and regulation of large/complex industrial and other processes with significant polluting potential, on the basis of integrated pollution control (IPC) and the application of best available technologies for this purpose;
- the monitoring of environmental quality, including the establishment of databases to which the public will have access, and the publication of periodic reports on the state of the environment;
- advising public authorities in respect of environmental functions and assisting local authorities in the performance of their environmental protection functions;
- the promotion of environmentally sound practices through, for example, the encouragement of the use of environmental audits, the setting of environmental quality objectives and the issuing of codes of practice on matters affecting the environment;
- the promotion and co-ordination of environmental research;
- the licensing and regulation of all significant waste disposal and recovery activities, including landfills and the preparation and periodic updating of a national hazardous waste management plan for implementation by other bodies;
- implementing a system of permitting for the control of VOC emissions resulting from the storage of significant quantities of petrol at terminals;
- implementing and enforcing the GMO Regulations for the contained use and deliberate release of GMOs into the environment;

- preparation and implementation of a national hydrometric programme for the collection, analysis and publication of information on the levels, volumes and flows of water in rivers, lakes and groundwaters; and
- generally overseeing the performance by local authorities of their statutory environmental protection functions.

Status

The Agency is an independent public body. Its sponsor in Government is the Department of the Environment and Local Government. Independence is assured through the selection procedures for the Director General and Directors and the freedom, as provided in the legislation, to act on its own initiative. The assignment, under the legislation, of direct responsibility for a wide range of functions underpins this independence. Under the legislation, it is a specific offence to attempt to influence the Agency, or anyone acting on its behalf, in an improper manner.

Organisation

The Agency's headquarters is located in Wexford and it operates five regional inspectorates, located in Dublin, Cork, Kilkenny, Castlebar and Monaghan.

Management

The Agency is managed by a full-time Executive Board consisting of a Director General and four Directors. The Executive Board is appointed by the Government following detailed procedures laid down in the Act.

Advisory Committee

The Agency is assisted by an Advisory Committee of twelve members. The members are appointed by the Minister for the Environment and Local Government and are selected mainly from those nominated by organisations with an interest in environmental and developmental matters. The Committee has been given a wide range of advisory functions under the Act, both in relation to the Agency and to the Minister.



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List of Abbreviations

BAT	Best Available Techniques
BATNEEC	Best available technology not entailing excessive costs
BLG	Better Local Government
CAP	Common Agricultural Policy
DAFRD	Department of Agriculture Food and Rural Development
DEHLG	Department of Environment, Heritage and Local Government
EMS	Environmental Management System
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information System
GSI	Geological Survey of Ireland
IAE	Intensive Agricultural Enterprise
ICMSA	Irish Creamery Milk Suppliers Association
IDA	Irish Development Agency
IFA	Irish Farmers Association
IPC	Integrated Pollution Control
IPPC	Integrated Pollution Prevention and Control
LA	Local authority
LGCSB	Local Government Computer Services Board
MRP	Molybdate reactive phosphorus
N	Nitrogen
NMP	Nutrient Management Plan
OECD	Organisation for Economic Co-operation and Development
P	Phosphorus
RBD	River Basin District
RBM	River Basin Management
REPS	Rural Environment Protection Scheme
SIPTU	Services, Industrial, Professional and Technical Union
SPC	Strategic Policy Committee
SUDS	Sustainable Urban Drainage System
UWWT	Urban Waste Water Treatment
VEC	Vocational Educational Committee
WFD	Water Framework Directive
WQMMS	Water Quality Monitoring and Management System
WWTP	Waste Water Treatment Plants

Executive Summary

This is the second National Implementation Report published by the Environmental Protection Agency (EPA) on the Phosphorus Regulations. It is prepared under Article 4(4) of the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998 (S.I. 258 of 1998). The report has been prepared from information and water quality data submitted by local authorities in their Implementation Reports and from water quality data collected by the Agency.

The Phosphorus Regulations require that water quality be maintained or improved by reference to the baseline biological quality rating (rivers) or trophic status (lakes) assigned by the Agency in the 1995-97 review period or at the first occasion thereafter. Water quality targets set in the Regulations must be met by 2007 at the latest for waters surveyed by the EPA in the 1995-97 period and within a maximum of ten years for waters first surveyed after 1997. The Agency has published a number of reports relating to the Regulations (Clenaghan *et al.*, 2000, 2001) and must publish a National Report on Implementation of the Regulations every two years to 2009. This report is based largely on Implementation Reports that the local authorities were obliged to submit to the Agency by 31 July 2002.

Current monitoring indicates that, in the case of rivers, the water quality at 61.8 per cent of the monitoring stations nationally is compliant with the Regulations i.e., the water quality at these stations meets the biological and/or the phosphorus targets in the Regulations. This represents an increase of 1.1% in compliance from the previous reporting period. A total of 56.8 per cent of river stations meet the biological targets of the Regulations. This represents a decline of 1.4% in the number of stations meeting the biological targets of the Regulations from the previous reporting period (1998-2000).

Local authorities with a relatively high level of compliance (> 70 per cent of river stations compliant) with the Regulations are Dublin City, Kerry, Sligo, Cavan, South Dublin and Mayo. Local authorities with a relatively low level of compliance (< 50 per cent of river stations compliant) with the Regulations are Monaghan, Meath, Fingal, Dun Laoghaire-Rathdown, Longford and Kilkenny.

Marked increases in compliance between reporting periods are apparent in Dublin City, Dun Laoghaire-Rathdown, Cavan, Kildare, Westmeath, Fingal and Louth. These increases are largely due to increased monitoring for phosphorus and in some cases (most notably Dublin City) reductions in phosphorus levels. However, only Fingal exhibits a notable increase in the percentage of stations meeting the biological targets of the Regulations. A marked decline in compliance with the Regulations was apparent in Monaghan, but this was largely due to a reduction in phosphorus monitoring from the previous reporting period. Kilkenny, Carlow, Clare and Wicklow all recorded moderate declines in the number of stations meeting the biological targets of the Regulations.

A worrying trend is the continuing decline in the number and percentage of river stations of highest biological water quality (Q5) (down from 3.1 per cent of stations to 2.7 per

cent of stations between reporting periods). Similar analysis also reveals a decline of 1.1 per cent in stations of Q4-5 status between the two reporting periods. It is recommended that local authorities identify the causes of decline in these waters and rectify them as a matter of urgency.

Since the last report there have been 201 additional lakes assigned baseline values, with 321 lakes now having targets set under the Regulations. Updated biological/phosphorus information is available on 238 of these lakes. 152 of these lakes currently comply with the targets set in the Regulations and the remaining 86 do not. However 31 of the 86 non-compliant lakes must have their baseline trophic status confirmed by further sampling. These 31 lakes are all in Monaghan. Counties with a relatively large number of non-compliant lakes (>4) include Cavan, Clare, Cork, Donegal, Galway, Leitrim and Monaghan.

A wide range of measures is being implemented or is proposed by the local authorities. The individual measures for planning, control and enforcement, monitoring, consultation and co-operation, public education and other agri-environmental measures are listed and described in this report. The occurrence of the Foot and Mouth crisis hampered local authority and EPA activities to some degree in 2001. Nevertheless, progress has been made by a number of local authorities, e.g., in the introduction of agricultural bye-laws, in reviewing discharge licences, in conducting farm surveys and misconnection surveys, and in implementing Geographical Information Systems to manage and interrogate water quality related information. The development of teams within local authorities (e.g., Limerick and Cork) to tackle water quality issues and in particular the Phosphorus Regulations is welcome. While availability of resources is still an issue for many local authorities there appears to have been some improvement in this regard, which should enable more effective implementation of measures. Actions undertaken by the EPA and each local authority to bring about compliance with the targets set in the Regulations are documented in this report.

Issues raised to date in implementation of the Regulations and future recommendations are presented. Where possible, the effectiveness of measures being applied by local authorities are assessed and commented on. The installation of phosphorus removal at certain inland wastewater treatment plants has proved successful in improving water quality. However, problems remain at a number of wastewater treatment plants despite upgrading due to, for example, overloading and stormwater overflows. A number of local authorities report that many single house treatment systems are not installed or maintained properly. Considerable effort is required to rectify this situation. Increased co-operation between Planning and Environment sections in local authorities is required with water quality issues being a key consideration in the preparation of County Development Plans. Greater efforts are also required in the enforcement of local authority discharge licences.

Few local authorities are using nutrient management planning powers available to them under the Water Pollution Act. In addition, a number of local authorities are stalling the introduction of agricultural bye-laws until the implications of implementation of the Nitrates Directive in Ireland becomes clear. As agriculture can pose a serious threat to water quality in many catchments it is important that local authorities address pollution threats from this sector adequately. Evidence is presented in this report that indicates that a number of measures can prove successful. These include REPS uptake, farm surveys

and nutrient management planning. Involvement of farming organisations and the general public in water quality initiatives (such as introduction of bye-laws or catchment farm surveys) has proven successful. Public participation enhances the sense of ownership of a problem, especially where water quality issues can be related to waters in the relevant locality.

Local authorities will play a key role in the implementation of the Water Framework Directive in Ireland. The River Basin Management projects, which have been established to facilitate implementation of the Directive, should help provide local authorities with the information necessary to protect and improve water quality within their functional areas. The projects should assist local authorities in gaining co-operation from all relevant sectors and other interested parties to enable successful water quality management. However, it is important to stress that the local authorities are responsible for implementing many of the measures required under the Water Framework Directive and that the success of the Directive, and indeed the Phosphorus Regulations, will largely depend on their implementation. Current monitoring results indicate that considerable and ongoing efforts will be required to meet the water quality targets of the Regulations. The increased collection of biological and chemical water quality data over the coming years will provide a clearer picture of the effectiveness of the measures implemented by the local authorities and the EPA. The EPA will continue to evaluate the relative success of these measures in future National Implementation Reports.

1. Introduction

EPA reports have clearly documented that surface water quality in Ireland has declined over the last thirty years, despite a slight improvement reported in recent years (McGarrigle *et al.*, 2002). Long-term monitoring of 2900km of river channel has shown a reduction in the length of unpolluted waters from 84 per cent in 1971 to 57 per cent in the 1998-2000 review period. More recent monitoring of a larger, considerably more representative baseline of 13,200 km indicates that the length of unpolluted river channel has declined from 77 per cent in 1987-90 to 70 per cent in the 1998-2000 review period. The Agency has identified eutrophication as the major threat to water quality in Ireland, with the basic cause in most cases likely to be excess phosphorus inputs.

In 1997, the Government published a strategy document *Managing Ireland's Rivers and Lakes — A Catchment Based Strategy Against Eutrophication* (DoE, 1997) which set out Ireland's pollution reduction programme in respect of phosphorus. The Strategy identified a long-term target of improving all unsatisfactory waters in rivers and lakes to a level consistent with the beneficial uses of the water. Interim quality standards were also identified, which are to be achieved generally over a ten-year time frame. In order to give effect to these interim quality standards and to meet, in part, the requirements of the Dangerous Substances Directive (CEC, 1976), the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998, were introduced. These Regulations were unique in Europe in their inclusion of direct ecological assessment of the impact of eutrophication (Lucey *et al.*, 1999). This ecological approach foreshadowed the introduction of the EU Water Framework Directive (CEC, 2000), which strongly emphasises ecological assessment and sets a target of good ecological quality for all of the Community's surface waters, to be met by 2015.

The Regulations require that water quality be maintained or improved by reference to the biological quality rating (rivers) or trophic status (lakes) assigned by the Agency in the 1995-97 review period or at the first occasion thereafter. This represents the baseline water quality data. Where water quality is deemed unpolluted (i.e., a river biological quality rating of Q4, Q4-5 or Q5, or an oligotrophic / mesotrophic lake status has been assigned by the Agency), the Regulations require that the existing water quality be maintained. Where quality has been found to be unsatisfactory, the Regulations require that the water be improved by 2007 at the latest for waters surveyed by the EPA in the 1995-97 period and within a maximum of ten years for waters first surveyed after 1997. The degree of improvement required is based on the baseline quality and on the standards prescribed by the Regulations. For more seriously polluted lakes and rivers, the targets set, if attained, may not necessarily ensure that these waters are of satisfactory quality. This takes into account the fact that recovery may take a long time in some catchments, e.g., where high soil phosphorus levels are contributing to water quality deterioration.

In the case of rivers, the standards prescribed in the Regulations may be met by achieving either the target biological quality rating or the target median molybdate-reactive phosphorus (MRP) concentration (Table 1). In the case of lakes, the standards prescribed in the Regulations may be met by achieving either the target trophic status classification or the target average total phosphorus concentration (Table 2). A six year

extension to the period allowed to reach compliance with the Regulations is permissible in exceptional circumstances.

The target river standards specified in the Regulations are based on a well-established relationship between ecological quality in Irish rivers and phosphate levels (Table 1). Examination of measurements recorded at river stations in surveys since 1983 have revealed a strong statistical relationship between biological Q-ratings and MRP concentrations in Irish rivers in general (McGarrigle *et al.*, 1992; Lucey *et al.*, 1999). The empirical relationship suggests that, once annual median MRP values exceed 30 µg P/l, there is a strong statistical likelihood that the river reach in question will have a significant eutrophication problem. Thus it is likely that the ecology of such reaches will be adversely affected, with altered floral and faunal communities. Typical effects include excessive algal and macrophyte growth with consequent reduced dissolved oxygen values during the hours of darkness and the loss of sensitive macroinvertebrate species, including certain mayflies and stoneflies. Salmonid fish populations are generally not sustainable in such eutrophic rivers. Lakes into which such rivers flow will be at risk of algal blooms. However, as this statistical relationship has relatively wide confidence limits, individual stations with annual median MRP concentrations greater than 30 µgP/l will not necessarily show these biological effects in every case (Lucey *et al.*, 1999).

The target lake standards are based on the Agency's classification for lakes which, in turn, is derived from a scheme proposed by the OECD (OECD, 1982). The baseline trophic status of the water body, which determines the target to be achieved, is defined solely by a biological parameter, in this case annual maximum chlorophyll *a* concentration. The chlorophyll concentration is a measure of the planktonic algal biomass, the feature primarily affected by eutrophication in most lakes. The target total phosphorus concentrations that are required for mesotrophic, eutrophic and hypertrophic lakes are more onerous than the corresponding values for mesotrophic and eutrophic lakes proposed in the OECD scheme (Table 2).

The Regulations require that the Agency and the local authorities take all such steps as may be appropriate in discharge of their functions to secure compliance with the quality standards specified in the Regulations. The local authorities were required to submit a Measures Report to the Agency by 31 July 1999, setting out the measures to be taken to meet the prescribed standards (Table 3). This was to be followed up by the submission of an Implementation Report to the Agency by 31 July 2000 and every two years thereafter until 2008. The Agency has published a number of reports relating to the Regulations (Clenaghan *et al.*, 2000, 2001). This report is the second of a series of National Reports on the Implementation of the Regulations, which the Agency must publish every two years until 2009. This report is based largely on Implementation Reports that the local authorities were obliged to submit to the Agency by 31 July 2002.

Table 1 Phosphorus Regulations target values for Irish rivers

If	Then	
The existing Q-value ¹ falls into the category below:	Either The minimum Q-value ¹ to be achieved is:	Or The median molybdate-reactive phosphate concentration ² (µgP/l) to be achieved is:
5	5	15
4-5	4-5	20
4	4	30
3-4	4	30
3	3-4	50
2-3	3	70
≤2	3	70

¹Biological Quality Rating (Q-value) as assessed by EPA staff during National River Monitoring Programmes.

²Molybdate-Reactive Phosphate (MRP) median concentration to be determined as a minimum of 10 samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such a period, the median concentration shall be determined from sampling conducted over such period, being a period not exceeding 24 months, as required to obtain a minimum of 15 samples taken at intervals of four weeks or longer.

Table 2 Phosphorus Regulations target values for Irish lakes

If	Then	
The Existing Trophic Status ¹ is:	Either The minimum target Trophic Status ¹ to be achieved is:	Or The average total phosphorus concentration ² (µg P/l) to be achieved is:
Satisfactory		
Ultra-Oligotrophic	Ultra-Oligotrophic	<5
Oligotrophic	Oligotrophic	>5<10
Mesotrophic	Mesotrophic	>10<20
Unsatisfactory		
Eutrophic	Mesotrophic	>10<20
Hypertrophic	Eutrophic	>20<50

¹Trophic status means the trophic status for any part of a lake assigned by the Agency during National Lake Monitoring Programmes.

²Average total phosphorus concentration to be determined as a minimum of 10 samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such a period, the average concentration shall be determined from sampling conducted over such period, being a period not exceeding 24 months, as required to obtain a minimum of 15 samples taken at intervals of four weeks or longer.

Table 3 Reporting Obligations under the Phosphorus Regulations

Local Authority Reports	EPA Reports
31 July 1999 (Measures)	Synthesis Report of Measures Reports (not a statutory requirement) (Clenaghan <i>et al.</i> , 2000)
31 July 2000 (Implementation)	30 April 2001 (National Implementation) (Clenaghan <i>et al.</i> , 2001)
31 July 2002 (Implementation)	30 April 2003 (National Implementation)
31 July 2004 (Implementation)	30 April 2005 (National Implementation)
31 July 2006 (Implementation)	30 April 2007 (National Implementation)
31 July 2008 (Implementation)	30 April 2009 (National Implementation)

2. Implementation Reports - General Information

The Implementation Reports are generally divided into a number of sections based on the recommendations of the EPA Guidance Note (EPA, 2000a). The Implementation Reports consisted of sections on current water quality in the local authority functional area; an update on implementation of measures proposed in the Measures Report (presented in tabular format); and a description of progress to date. It was recommended that any problems encountered in implementation of the Regulations, and future plans or new directions that the local authority considered necessary, should also be addressed in the reports.

The EPA Guidance Note was used as a template for the majority of Implementation Reports. This helped to ensure consistency of reporting and that relevant information would be included in the reports. The local authorities generally supplied the information requested. However, there was considerable slippage on the statutory submission date of Implementation Reports by most local authorities (Table 4).

Under Article 3(9) of the Regulations, the period set for compliance (i.e. 2007) may be extended for a period not exceeding six years for any part of a river or lake, if, but only if, the relevant local authority or, as the case may be, the Agency is satisfied that certain exceptional circumstances exist, as laid out in the Regulations. Four local authorities state that they may or will need Article 3(9) extensions to comply with the Regulations. These are Cork, Dublin City, Limerick and Monaghan. Cork has stated that Article 3(9) extensions may be required at 39 river stations identified in the Implementation Report and at Iniscarra Lake. Monaghan has stated that it needs an Article 3(9) extension for the entire county for six years. Limerick has stated that it requires an Article 3(9) extension for all unsatisfactory stations in the county for six years. Dublin City has stated that it requires Article 3(9) extensions at all stations in its functional area (time period not specified). The reasons for these time extensions are set out in the relevant local authority Measures and Implementation Reports.

All of the local authorities that have submitted Reports to the Agency have endorsed the environmental management systems approach to the implementation of the Regulations as recommended in the EPA Guidance Notes. This approach operates on the basic principle of **continual improvement**, which is at the heart of the Regulations and the overall national strategy to combat eutrophication. The common principles underpinning an environmental management system are outlined in Figure 1, adapted to the requirements of the Regulations.

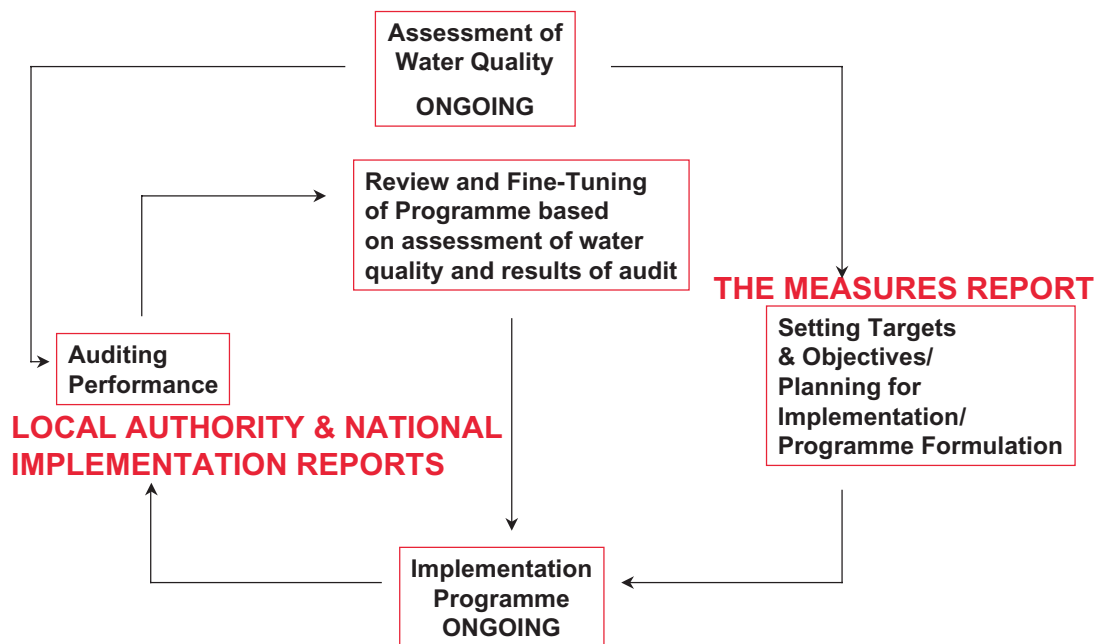


Figure 1 Generalised environmental management systems approach adapted to requirements of the Regulations

On an operational level the environmental management system consists of:

- initial review (i.e. reviews of physical background, water quality, pressures on water resources, monitoring programmes etc. as carried out for the Measures Reports);
- formulation of measures and targets;
- formulating an environmental management programme or, in this case, an implementation programme for achieving the targets;
- assigning responsibility for achieving targets and implementing actions;
- implementing the programme;
- auditing the performance of the programme; and
- review and fine tuning of the programme until the standards are met.

The environmental management programme is often described as the engine for continual improvement. However, targets will only be met by keeping the system dynamic and subjecting the system to periodic auditing to assess the relative success of measures chosen for meeting the targets. Auditing, in turn, provides information that can be used for reviewing and fine tuning the system so that changes or modifications can be made where necessary. The Regulations are particularly suited to an environmental management systems approach given the requirement that local authorities must report every two years to the Agency on the implementation of the Regulations. The Agency recommends that a system audit be conducted prior to preparation of each Implementation Report so that any changes or modifications necessary to meet the standards can be included in the updated report. New measures are likely to emerge over the coming years, for instance, through new legislation or the creation of new initiatives. Each local authority will need to keep abreast of changes and developments that might impact on the implementation of the Regulations.

Table 4 Information included in local authority Implementation Reports

(Y = included, P = information partially submitted, N = information not submitted, N/A = not applicable)

Local Authorities	Carlow	Cavan	Clare	Cork	Cork City	Donegal	Dublin City	Dublin South	DLR	Fingal	Galway Co./ City	Kerry	Kildare	Kilkenny	Laois	Leitrim
Date Implementation Report Received by EPA	04/06/03	31/7/02	01/8/02	11/2/03	17/10/02	22/10/02	13/11/02	22/10/02	1/8/02	09/8/02	21/10/02	17/10/02	27/9/02	31/7/02	29/7/02	11/10/02
Water Quality																
River biological water quality information provided	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
River MRP information provided	N	Y	Y	Y	N/A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lake trophic status information provided	N/A	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	Y	Y	N/A	N/A	N/A	Y
Lake total phosphorus information provided	N/A	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	Y	Y	N/A	N/A	N/A	N
Implementation Programme Summary																
County Implementation Programme Table	Y	Y	N	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
River Implementation Programme Table	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Lake Implementation Programme Table	N/A	Y	Y	Y	N	Y	N/A	N/A	N/A	N/A	Y	Y	N/A	N/A	N/A	Y
Description of Progress to Date																
Progress During Reporting Period	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Description of Problems Encountered	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Future Plans / New Directions	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Are Article 3(9) extensions sought?				Y			Y									

Table 4 (continued) Information included in local authority Implementation Reports.

(Y = included, P = information partially submitted, N = information not submitted, N/A = not applicable)

Local Authorities	Limerick	Limk. City	Longford	Louth	Mayo	Meath	Monaghan	Offaly	Roscommon	Sligo	North Tipp.	South Tipp.	Waterford	Waterford City	Westmeath	Wexford	Wicklow
Date Implementation Report Received by EPA	29/10/02	07/10/02	09/07/03	21/10/02	14/10/02	21/3/03	30/7/02	13/8/02	07/10/02	25/07/03	23/06/03	25/10/02	16/8/02	26/9/02	30/8/02	20/06/03	02/05/03
Water Quality																	
River biological water quality information provided	Y	N/A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
River MRP information provided	Y	N/A	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y
Lake trophic status information provided	Y	N/A	N	N/A	Y	N	Y	N/A	N/A	Y	Y	N/A	Y	N/A	Y	N/A	Y
Lake total phosphorus information provided	N	N/A	N	N/A	Y	Y	Y	N/A	N/A	P	Y	N/A	N	N/A	Y	N/A	Y
Implementation Programme Summary																	
County Implementation Programme Table	Y	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
River Implementation Programme Table	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y
Lake Implementation Programme Table	Y	N	N	N/A	Y	Y	Y	N/A	N/A	Y	Y	N/A	Y	N/A	N	N/A	Y
Description of Progress to Date																	
Progress During Reporting Period	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Description of Problems Encountered	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Future Plans / New Directions	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Are Article 3(9) extensions sought?	Y						Y										

3. Water Quality Review

Before discussing current trends in water quality at river and lake monitoring stations a number of important points need to be stressed.

Firstly, all of the analyses of river water quality in this report are based on biological data collected by the EPA at river monitoring stations since 1 January 1995 and published in subsequent reports (Doris *et al.*, 1999; Clabby *et al.*, 1999, 2000, 2001, 2002); and on current median MRP data collected at these monitoring stations (by the EPA and local authorities) which meets the sampling criteria specified in the Regulations. In certain cases, where median MRP data were not provided in local authority Implementation Reports, these data were obtained from recent EPA regional laboratory (Kilkenny, Monaghan and Castlebar) reports compiled for certain local authorities (in the south-east, north-east and west of the country respectively).

Secondly, in order to simplify assessment of local authority compliance with water quality standards for 'parts of rivers', as required by the Regulations, the results presented in this report are based on trends in water quality **at the monitoring stations**. *Water Quality in Ireland* reports published by the Agency primarily analyse trends in river water quality based on interpolation of conditions **between monitoring stations** i.e., based on calculations of length of river channel in each water quality class. This approach is not used in this report given the complexity of calculating trends at a local authority level using this method. Therefore the definitive account of national and regional trends in water quality, based on channel length analyses, is published in the *Water Quality in Ireland 1998-2000* report (McGarrigle *et al.*, 2002).

Thirdly, the review of water quality at river monitoring stations in this report is based on the various categories of Q-values and MRP levels specified in the Regulations. The review of water quality based on these categories, and the approach of using the better of either the biological or phosphorus monitoring results to determine water quality compliance status, differs somewhat from EPA analysis in *Water Quality in Ireland* reports, which has primarily been based on biological data. Similar differences exist between this report and *Water Quality in Ireland* reports in analyses of trends in lake water quality. *Water Quality in Ireland* reports primarily utilise information on chlorophyll *a* to determine lake water quality. In this report, the better of either the chlorophyll *a* or total phosphorus monitoring results are used to determine lake water quality compliance status, as required by the Regulations.

The responsibility for meeting the targets set in the Regulations lies principally with the local authorities, therefore the focus in this report is primarily on trends in water quality at river monitoring stations or lakes in each local authority functional area, as well as on national trends. The baseline status of river water quality at monitoring stations in each local authority area is presented in Table 5. It is important to note that the baseline data is based on Q values only, as required by the Regulations. Although the baseline now comprises a total of 3355 stations, the compliance analyses in this report are carried out on the 3253 stations for which there are either Q data available in the 1998-2001 period or MRP data available in the 2001-2002 period (Table 6).

Current monitoring data from the 1998-2002 period is presented based on the Q or MRP values, depending on which is of higher quality as required by the Regulations (Table 6). Approximately 21 per cent of stations were monitored for MRP in the 2001-02 period in accordance with the sampling requirements of the Regulations, compared to just 10 per cent of stations in the previous report. Biological data were updated at approximately 27 per cent of stations since the last report. A total of 42 per cent of stations were updated for biology or MRP in the 2001/2002 period (Appendix 1.1).

This report focuses on both the number and percentage of stations in each local authority and nationally which are **compliant** with the Regulations and compares this with the situation pertaining when the last report was published (Clenaghan *et al.*, 2001). Compliance of river water quality at monitoring stations with the Phosphorus Regulations may be based on the better of either the biological water quality or the MRP levels. The target river water quality to be attained at most stations (or 'parts of rivers') by 2007 is presented in Table 8 (those stations first assigned a biological quality rating after 1997 have ten years to meet the target set in the Regulations).

The current monitoring data from the 1998-2001 period is also analysed based on Q-values only (Table 7), to provide more accurate comparison with the comparable baseline data (Appendix 1.2) and with the previous report. The comparison with the previous report is primarily based on the percentage of stations meeting the biological targets of the Regulations. The comparison with baseline data includes an examination of the number and percentage of stations in each local authority and nationally which are of **satisfactory** status i.e., of biological status Q4 or better (as compliance data is not available for the baseline survey). It is important to note that the terms compliant and satisfactory as used in this report are not equivalent. It is possible for water quality at a station to be compliant with the Regulations but of unsatisfactory status, e.g., if the water quality has improved from Q3 to Q3-4. Equally it is possible for the water quality at a station to be satisfactory but not compliant, e.g., if the water quality has declined from Q5 to Q4-5.

Current monitoring indicates that, in the case of rivers, the water quality at 61.8 per cent of the monitoring stations nationally is compliant with the Regulations i.e., the water quality at these stations meets the biological and/or the phosphorus targets in the Regulations (Table 6, Figure 2). This represents an increase of 1.1% in compliance from the previous reporting period. This may largely be accounted for by the substantial increase in MRP monitoring between reporting periods described above.

A total of 56.8 per cent of river stations meet the biological targets of the Regulations (Table 7, Figure 2). This represents a decline of 1.4% in the number of stations meeting the biological targets of the Regulations from the previous reporting period. Considerably fewer stations meet the biological targets in the Regulations in Cavan, Westmeath, Kildare, Dun Laoghaire-Rathdown, Dublin City and South Dublin, than are compliant with the Regulations (Figure 2). These local authorities have achieved compliance with the Regulations at a relatively large proportion of their river monitoring stations based on MRP levels.

Local authorities with a relatively high level of compliance (> 70 per cent of river stations compliant) with the Regulations are Dublin City, Kerry, Sligo, Cavan, Dublin South and Mayo (Figure 2). Local authorities with a relatively low level of compliance

(< 50 per cent of river stations compliant) with the Regulations are Monaghan, Meath, Fingal, Dun Laoghaire-Rathdown, Longford and Kilkenny.

Marked increases in compliance between reporting periods are apparent in Dublin City, Dun Laoghaire-Rathdown, Cavan, Kildare, Westmeath, Fingal and Louth (Figure 3). These increases are largely due to increased monitoring for MRP and in some cases (most notably Dublin City) reductions in MRP levels. However, only Fingal exhibits a notable increase in the percentage of stations meeting the biological targets of the Regulations. A marked decline in compliance with the Regulations was apparent in Monaghan, but this was largely due to a reduction in MRP monitoring from the previous reporting period. Kilkenny, Carlow, Clare and Wicklow all recorded moderate declines in the number of stations meeting the biological targets of the Regulations since the last report.

Despite the overall decline in biological water quality nationally since the last reporting period (1998-2000), there are still a greater percentage of stations currently of satisfactory status (i.e., Q4, Q4-5 or Q5) than there were in the baseline 1995-1997 survey (60.9 per cent as compared to 59.6 per cent). Local authorities with a high percentage of satisfactory stations (>70 per cent) occur in the west of the country (Figure 4). Local authorities with significant improvements in biological water quality since the Regulations were introduced include Galway, North Tipperary, Longford, Carlow, Westmeath, Wexford and Fingal. Those with a significant decline in the percentage of satisfactory stations include Dun Laoghaire Rathdown, South Dublin, Wicklow, Waterford and Cavan (Figure 5).

Percentage changes in compliance at monitoring stations of the Dublin local authorities (i.e., Dublin Corporation, Dun Laoghaire-Rathdown, Fingal and South Dublin) must be treated with some degree of caution, as there are very few monitoring stations in their functional areas (<20). Thus changes in water quality at a few stations can result in large percentage changes.

The decline in the number and percentage of river stations of highest biological water quality (Q5), which was highlighted in the previous Agency report (Clenaghan *et al.*, 2001), is continuing (down from 3.1 per cent of stations to 2.7 per cent of stations between reporting periods). Similar analysis also reveals a decline of 1.1 per cent in stations of Q4-5 status between the two reporting periods (from 20.7 per cent to 19.6 per cent). This decline is even more pronounced when considering that the equivalent baseline percentages for the same Q5 and Q4-5 stations (as those sampled in the 1998-2001 period) are 4.6 per cent and 21.2 per cent respectively (Figure 6). Many of these stations represent relatively pristine conditions and their protection is crucial to the survival of pollution sensitive species and important diverse and balanced invertebrate communities. These stations may also be very important as reference sites in the context of implementation of the Water Framework Directive.

Stations rated Q5 and Q4-5 are primarily found in river stretches with low levels of catchment pressures. These waters provide dilution for downstream rivers and lakes and are vital in maintaining high water quality. The decline in the quality of these waters may deleteriously affect attempts to improve the quality of polluted waters downstream. In the case of Q5 stations that have deteriorated since the baseline survey, local authorities had only identified the reason for this decline, in their Implementation Reports, in nine out of over sixty cases. The causes identified included forestry,

agriculture and sewage. It is very important that local authorities identify the reason for the ongoing decline in these high quality waters and take the necessary measures to protect and conserve them.

Since the last report 201 additional lakes have been assigned baseline values, with 321 lakes now assigned targets under the Regulations (Table 9, Appendix 1.3). Updated trophic status information is available on 238 of these lakes (with updated phosphorus information also available on 59 of them). 152 of these lakes currently comply with the targets set in the Regulations and the remaining 86 do not. (However, eight of the compliant lakes, 31 of the non-compliant lakes and three lakes for which there are no recent monitoring data, must have their baseline trophic status confirmed by further sampling. These 42 lakes are all in Monaghan.) Counties with a relatively large number of non-compliant lakes (>4) include Cavan, Clare, Cork, Donegal, Galway, Leitrim and Monaghan.

128 satisfactory lakes either maintained (116) or improved (12) trophic status. Fifteen lakes improved in trophic status from the baseline survey to meet the compliance targets of the Regulations. These include Sillan (Cavan); Ballycullinan (Clare); Abisdealy, Aderry, Avaul, Coolkelure, Fadda, Tooreen (Cork); Leane (Kerry); Annamakerrig, White (Monaghan); Knockaderry (Waterford); Bray Lower (Wicklow); and Loughs Ree and Derg on the Shannon. There have been significant reductions in phosphorus inputs to the Shannon system from remedial measures put in place there, including nutrient reduction at many of the WWTPs. However, it is thought that the infestation of the Shannon system with the zebra mussel *Dreissena polymorpha* is at least partly responsible for reducing the lake chlorophyll concentrations on which the trophic status determinations are made (Bowman, 2000).

Twenty-nine lakes have declined in trophic status from the baseline survey including Gowna North, Gowna South, Kinale, Nadreegeel (Cavan); Ballybeg, Cullaun (Clare); Ballin (Cork); Lough (Cork City); An Iuir, Columbkille Milford, Fad West, Kindrum, Kinny, New, Port (Donegal); Anillaun, Aunierin, Ballynahinch, Ballynakill, Cutra, Nahasleam East, Natawnymore, Rea (Galway); Gill (Kerry); Melvin (Leitrim); Muckno (Monaghan); Carra North, Knappaghbeg (Mayo); and Vartry Reservoir (Wicklow). Twenty-seven unsatisfactory lakes remained unimproved in trophic status, although one of these (Dromore Lake in Clare) meets the phosphorus targets of the Regulations, and is therefore compliant.

The National Lakes Monitoring Programme includes 110 lakes for surveying by remote sensing. In general these are less accessible, remote lakes and small lakes in relatively pristine catchments. Data gathered in September 2000 has been published on 99 of these lakes (McGarrigle *et al.*, 2002). However, as only one estimate on a single day was available for each lake baseline trophic status has not been assigned to these lakes as yet.

A number of local authorities have reported elevated MRP levels in groundwater in their Implementation Reports. The EPA has also recorded elevated levels of phosphorus in groundwaters in certain parts of the country (McGarrigle *et al.*, 2002). Whilst groundwater is not specifically covered in the Regulations, it may contribute to eutrophication of surface waters where elevated MRP levels exist, particularly where groundwaters provide significant amounts of baseflow in the summer months.

Thus it is apparent from current river, lake, and groundwater monitoring data that all local authorities will need to make a considerable effort to improve water quality in their functional area and to meet the requirements of the Phosphorus Regulations. Clearly significant challenges lie ahead.

Table 5 Baseline number of local authority river stations in each biological quality rating.

(*River stations Q4, Q4-5 or Q5; **Correcting for river stations bordering two local authority areas).

Either MRP Target (µg P/l) Or Q-value Target Baseline Status	15 Must retain quality or improve Q5	20 Q4-5	30 Q4	30 Improve to Q4 Q3-4	50 Improve to at least Q3-4 Q3	70 Improve quality to at least Q2-3	70 Q ₂ ≤2	Total	% Satisfactory (biology)*
Carlow	1	13	19	19	14	1	0	67	49.3
Cavan	7	25	29	24	21	4	0	110	55.5
Clare	16	29	79	20	22	8	1	175	70.9
Cork	6	121	171	59	24	3	1	385	77.4
Donegal	33	97	72	21	21	5	14	263	76.8
Dublin City	0	0	0	0	3	1	3	7	0
Dublin South	0	4	5	0	3	2	1	15	60.0
Dun Laoghaire Rathdown	1	0	2	1	4	0	1	9	33.3
Fingal	0	0	0	2	11	3	2	18	0
Galway	14	42	88	36	48	13	5	246	58.5
Kerry	12	71	76	29	18	1	3	210	75.7
Kildare	0	1	16	34	26	6	6	89	19.1
Kilkenny	2	3	35	32	24	1	2	99	40.4
Laois	3	13	36	33	18	2	3	108	48.1
Leitrim	10	29	34	10	5	2	0	90	81.1
Limerick	6	12	43	28	31	7	4	131	46.6
Longford	1	2	12	14	8	0	2	39	38.5
Louth	0	7	12	9	15	1	0	44	43.2
Mayo	15	71	103	30	29	5	4	257	73.5
Meath	0	0	20	39	32	4	6	101	19.8
Monaghan	1	13	9	11	34	5	3	76	30.3
Offaly	5	8	35	32	21	5	4	110	43.6
Roscommon	0	12	58	16	29	9	4	128	54.7
Sligo	3	41	35	11	11	1	1	103	76.7
North Tipperary	5	10	30	35	29	3	1	113	39.8
South Tipperary	2	14	56	19	23	3	1	118	61.0
Waterford	2	25	30	10	8	1	0	76	75.0
Westmeath	0	4	15	36	12	1	4	72	26.4
Wexford	0	11	35	34	28	4	2	114	40.4
Wicklow	18	34	35	13	14	0	3	117	74.4
Preliminary Total	163	712	1190	657	586	101	81	3490	
Revised Total**	158	699	1142	620	563	96	77	3355	
% of Revised Total	4.7	20.8	34.0	18.5	16.8	2.9	2.3		59.6

Table 6 Number of local authority river stations in each Q-value or median MRP level category in surveys undertaken in the 1998-2002 period and the number of stations compliant with the Phosphorus Regulations

(*River stations Q4, Q4-5 or Q5 or median MRP $\leq 30\mu\text{g P/l}$; **Correcting for river stations bordering two local authority areas).

Either Current MRP value ($\mu\text{g P/l}$) Or Current Q-value	15 Q5	20 Q4-5	30 Q4	50 Q3-4	70 Q3	Q2-3	Q ≤ 2	Total	% Satisfactory (biology or MRP)*	No. of Stations Compliant with Regulations	% of Stations Compliant with Regulations
Carlow	1	7	32	19	6	0	0	65	61.5	39	60.0
Cavan	30	17	36	20	6	1	0	110	75.5	81	73.6
Clare	16	32	69	16	26	6	1	166	70.5	105	63.3
Cork	18	125	221	16	3	0	0	383	95.0	262	68.4
Donegal	15	95	85	17	24	7	12	255	76.5	149	58.4
Dublin City	0	1	0	2	3	1	0	7	14.3	6	85.7
Dublin South	6	2	2	1	1	2	1	15	66.7	11	73.3
Dun Laoghaire Rathdown	1	1	2	3	2	0	0	9	44.4	4	44.4
Fingal	0	0	1	3	12	1	1	18	5.6	7	38.9
Galway	6	44	116	24	33	6	2	231	71.9	156	67.5
Kerry	57	56	62	18	8	4	1	206	85.0	163	79.1
Kildare	15	2	16	26	20	6	3	88	37.5	44	50.0
Kilkenny	0	3	39	42	13	0	1	98	42.9	48	49.0
Laois	4	22	24	33	15	1	4	103	48.5	57	55.3
Leitrim	8	31	31	9	6	2	0	87	80.5	59	67.8
Limerick	5	12	44	26	31	7	2	127	48.0	66	52.0
Longford	0	1	17	11	6	0	2	37	48.6	17	45.9
Louth	0	10	12	15	5	1	0	43	51.2	28	65.1
Mayo	9	79	105	27	18	7	1	246	78.5	177	72.0
Meath	1	2	19	39	27	9	2	99	22.2	37	37.4
Monaghan	0	9	11	9	35	7	1	72	27.8	24	33.3
Offaly	2	10	35	35	19	3	3	107	43.9	54	50.5
Roscommon	11	14	57	18	14	6	4	124	66.1	86	69.4
Sligo	9	40	31	7	11	0	1	99	80.8	74	74.7
North Tipperary	3	20	36	32	17	1	1	110	53.6	68	61.8
South Tipperary	1	17	53	22	16	2	4	115	61.7	70	60.9
Waterford	0	12	40	17	5	0	0	74	70.3	38	51.4
Westmeath	1	4	32	15	12	1	0	65	56.9	42	64.6
Wexford	2	8	48	27	23	2	1	111	52.3	62	55.9
Wicklow	8	29	39	17	17	0	2	112	67.9	57	50.9
Preliminary Total	229	705	1315	566	434	83	50	3382	-	2091	-
Revised Total**	217	691	1262	539	415	80	49	3253	-	2009	-
% of Total	6.7	21.2	38.8	16.6	12.8	2.5	1.5	-	66.7	-	61.8

Table 7 Number of local authority river stations in each biological quality status rating in the 1998-2001 surveys and the number of stations meeting the biological targets of the Regulations

Regulations (*River stations Q4, Q4-5 or Q5; **Correcting for river stations bordering two local authority areas).

Current Q-value Status	Q5	Q4-5	Q4	Q3-4	Q3	Q2-3	QA2	Total	% of Stations Satisfactory (biology only)*	No. of Stations Meeting Biological Targets of Regulations	% of Stations Meeting Biological Targets of Regulations
Carlow	1	7	31	19	7	0	0	65	60.0	37	56.9
Cavan	4	19	30	28	20	4	3	108	49.1	42	38.9
Clare	10	24	80	17	27	6	1	165	69.1	100	60.6
Cork	4	86	191	66	33	3	0	383	73.4	242	63.2
Donegal	15	95	85	17	24	7	12	255	76.5	149	58.4
Dublin City	0	0	0	0	3	1	3	7	0	1	14.3
Dublin South	1	2	3	2	3	2	2	15	40.0	5	33.3
Dun Laoghaire Rathdown	1	0	0	2	5	1	0	9	11.1	1	11.1
Fingal	0	0	1	3	12	1	1	18	5.6	7	38.9
Galway	6	43	116	24	34	6	2	231	71.4	155	67.1
Kerry	9	59	89	24	18	3	1	203	77.3	135	66.5
Kildare	0	4	13	27	34	5	4	87	19.5	28	32.2
Kilkenny	0	3	37	40	14	0	2	96	41.7	45	46.9
Laois	1	17	28	36	16	1	4	103	44.7	52	50.5
Leitrim	3	34	33	9	6	2	0	87	80.5	57	65.5
Limerick	5	9	46	26	32	7	2	127	47.2	63	49.6
Longford	0	1	17	11	6	0	2	37	48.6	17	45.9
Louth	0	7	11	13	10	0	0	41	43.9	23	56.1
Mayo	9	79	105	27	18	7	1	246	78.5	177	72.0
Meath	0	0	18	35	33	9	2	97	18.6	32	33.0
Monaghan	0	8	12	8	36	7	1	72	27.8	23	31.9
Offaly	2	10	35	34	20	3	3	107	43.9	54	50.5
Roscommon	1	13	60	20	18	6	5	123	60.2	78	63.4
Sligo	9	40	31	7	11	0	1	99	80.8	74	74.7
North Tipperary	2	19	34	34	19	1	1	110	50.0	63	57.3
South Tipperary	1	17	52	19	18	4	4	115	60.9	66	57.4
Waterford	0	11	40	16	6	1	0	74	68.9	35	47.3
Westmeath	0	1	22	25	15	2	0	65	35.4	29	44.6
Wexford	2	8	45	29	23	2	1	110	50.0	59	53.6
Wicklow	7	29	40	17	17	0	2	112	67.9	57	50.9
Preliminary Total	93	645	1305	635	538	91	60	3367	-	1906	-
Revised Total**	89	635	1249	608	512	86	59	3238	-	1838	-
% of Total	2.7	19.6	38.6	18.8	15.8	2.7	1.8	-	60.9	-	56.8

Table 8 Target number of local authority river stations in each biological quality rating or median MRP level category.

(*River stations Q4, Q4-5 or Q5 or median MRP $\leq 30\mu\text{g P/l}$; **Correcting for river stations bordering two local authority areas).

Either MRP Target ($\mu\text{g P/l}$) Or Q-value Target	15 Q5	20 Q4-5	30 Q4	50 Q3-4	70 Q3	Total	% Satisfactory (biology or MRP)*
Carlow	1	13	38	14	1	67	77.6
Cavan	7	25	53	21	4	110	77.3
Clare	16	29	99	22	9	175	82.3
Cork	6	121	230	24	4	385	92.7
Donegal	33	97	93	21	19	263	84.8
Dublin City	0	0	0	3	4	7	0
Dublin South	0	4	5	3	3	15	60.0
Dun Laoghaire Rathdown	1	0	3	4	1	9	44.4
Fingal	0	0	2	11	5	18	11.1
Galway	14	42	124	48	18	246	73.2
Kerry	12	71	105	18	4	210	89.5
Kildare	0	1	50	26	12	89	57.3
Kilkenny	2	3	67	24	3	99	72.7
Laois	3	13	69	18	5	108	78.7
Leitrim	10	29	44	5	2	90	92.2
Limerick	6	12	71	31	11	131	67.9
Longford	1	2	26	8	2	39	74.4
Louth	0	7	21	15	1	44	63.6
Mayo	15	71	133	29	9	257	85.2
Meath	0	0	59	32	10	101	58.4
Monaghan	1	13	20	34	8	76	44.7
Offaly	5	8	67	21	9	110	72.7
Roscommon	0	12	74	29	13	128	67.2
Sligo	3	41	46	11	2	103	87.4
North Tipperary	5	10	65	29	4	113	70.8
South Tipperary	2	14	75	23	4	118	77.1
Waterford	2	25	40	8	1	76	88.2
Westmeath	0	4	51	12	5	72	76.4
Wexford	0	11	69	28	6	114	70.2
Wicklow	18	34	48	14	3	117	85.5
Preliminary Total	163	712	1847	586	182	3490	-
Revised Total**	158	699	1762	563	173	3355	-
% of Revised Total	4.7	20.8	52.5	16.8	5.2	-	78.1

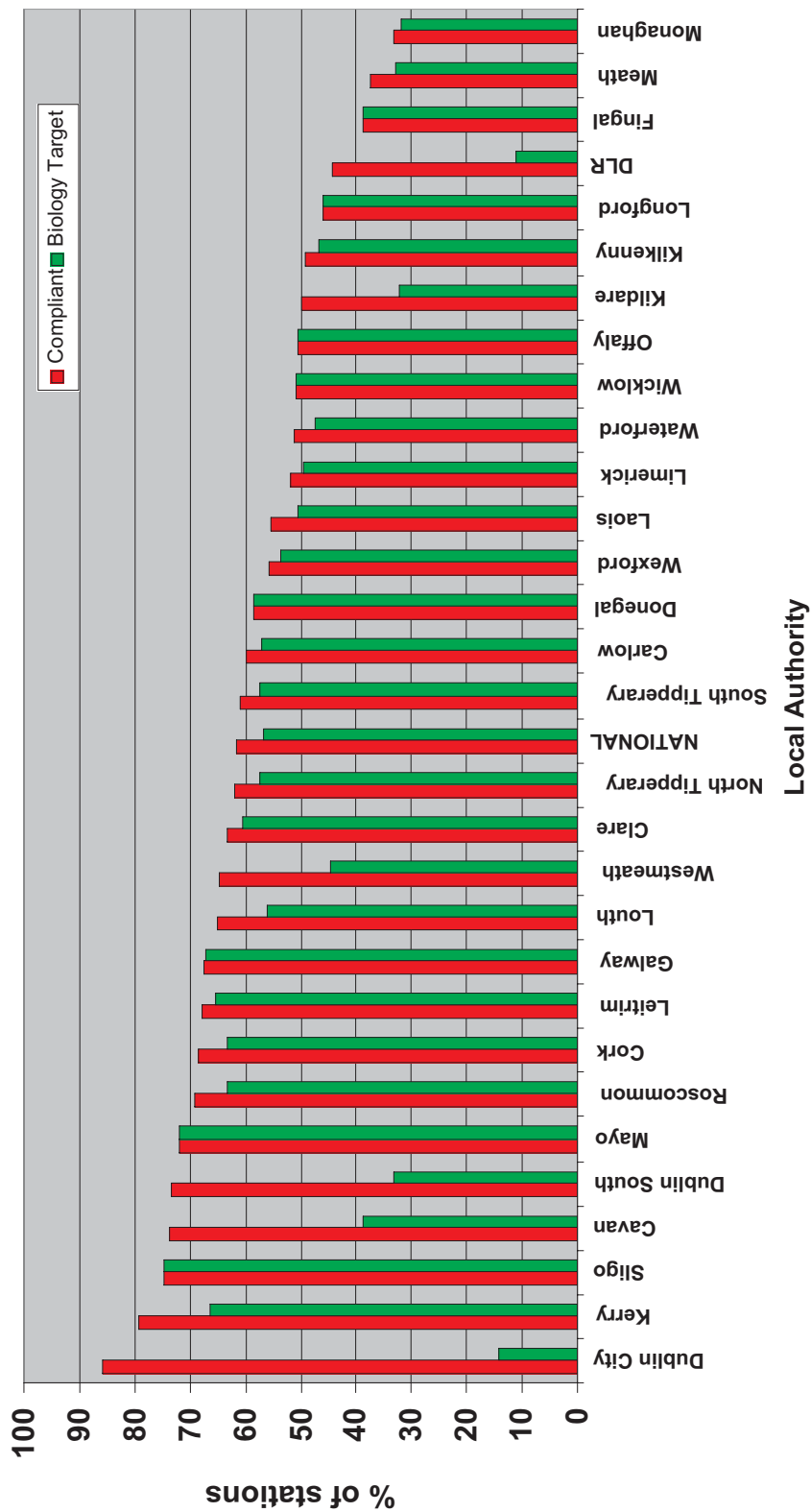
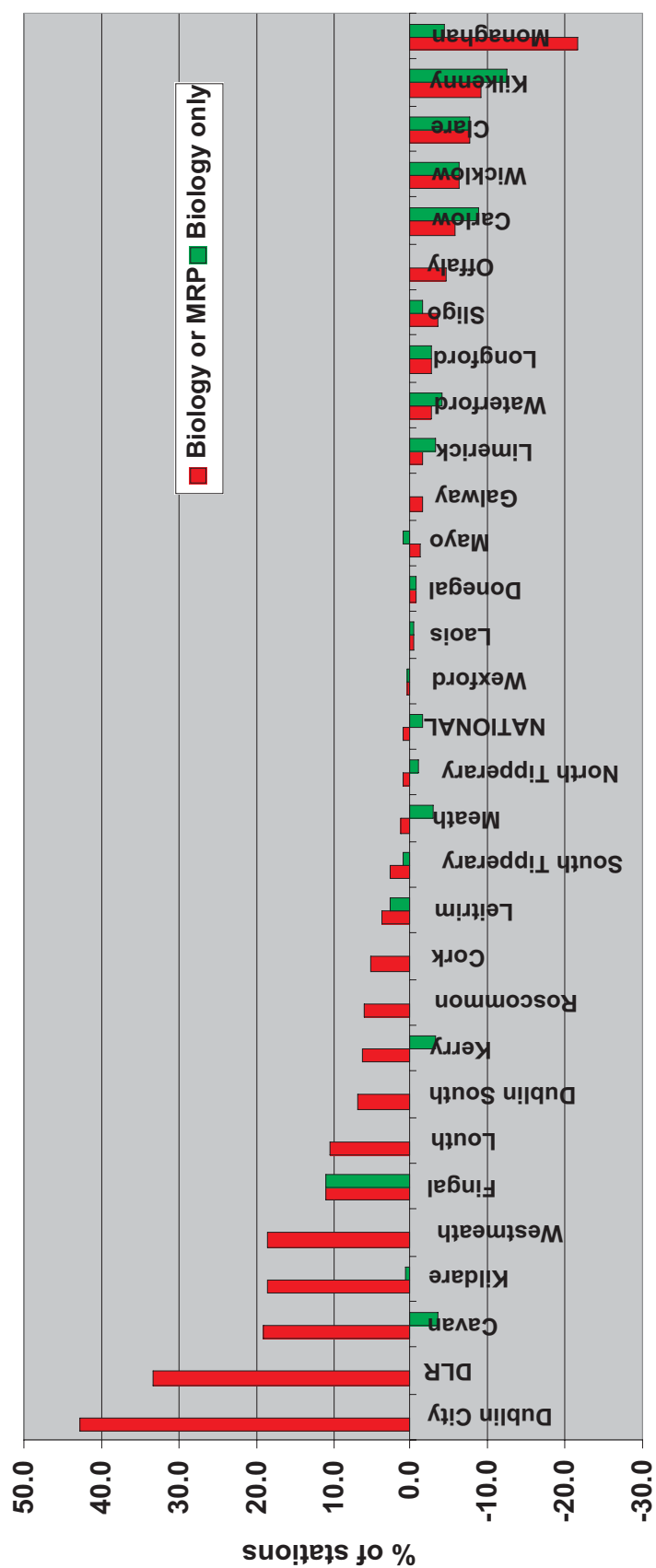


Figure 2 Percentage of local authority river stations compliant with the Phosphorous Regulations in 1998-2002 and percentage of local authority river stations meeting biological targets of the Regulations.



Local Authority

Figure 3 Percentage change in both number of river stations compliant with the Regulations and number of river stations meeting the biological targets of the Regulations, using most current results from 1998-2002 period, compared to 1998-2000 period.

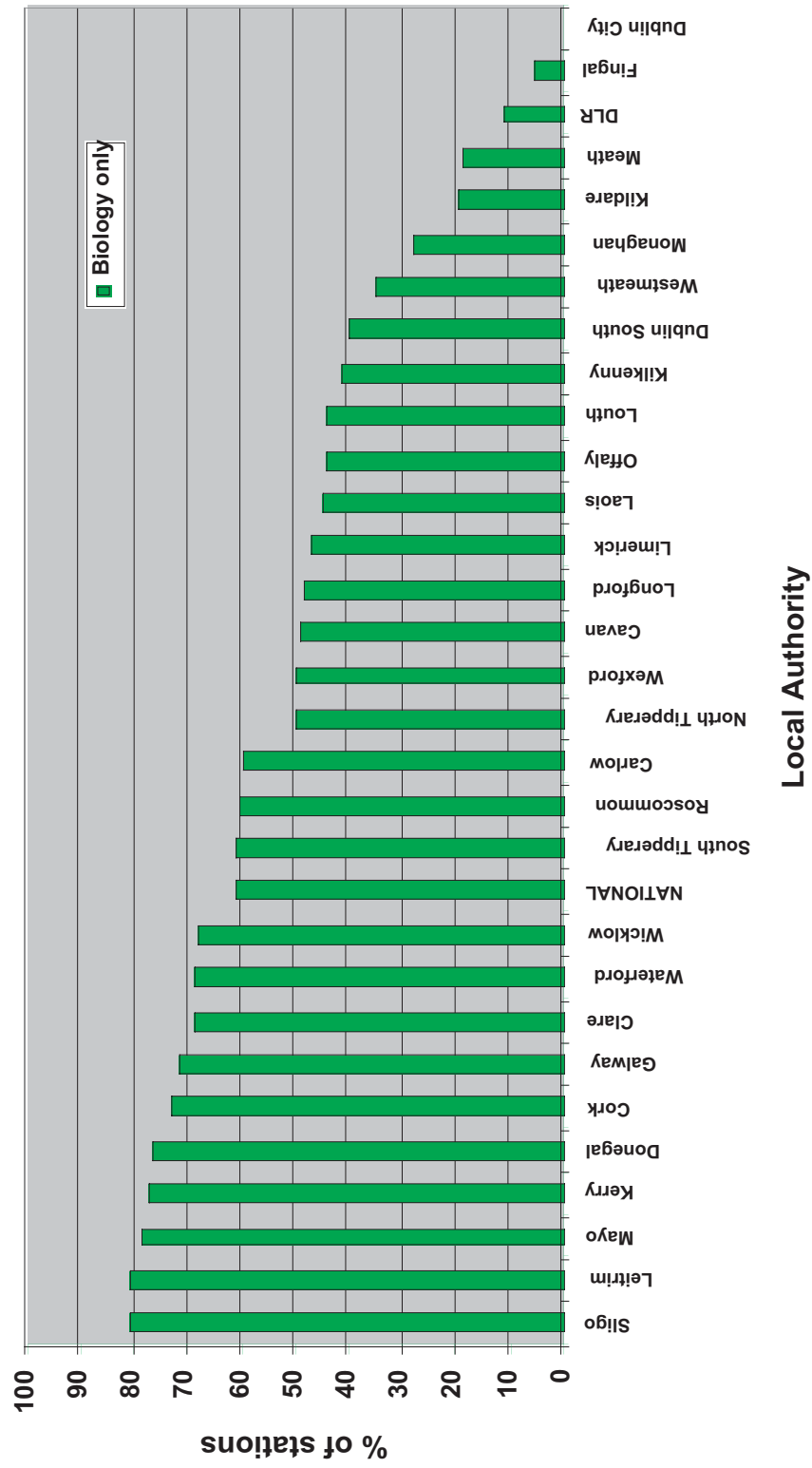


Figure 4 Percentage of local authority river stations with satisfactory biological water quality in 1998-2001.

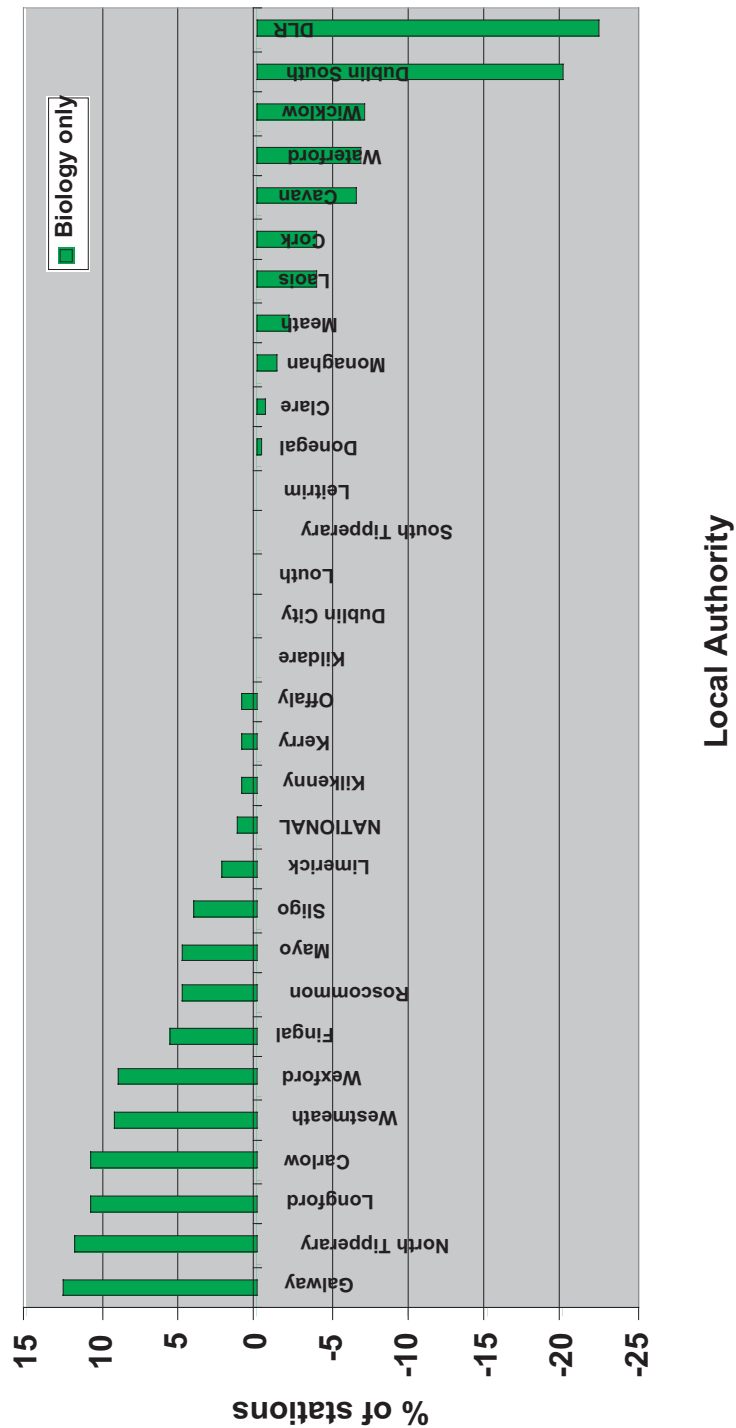


Figure 5 Percentage change in number of river stations with satisfactory biological water quality, using most current results from 1998-2001 period, compared to baseline 1995-1997 period.

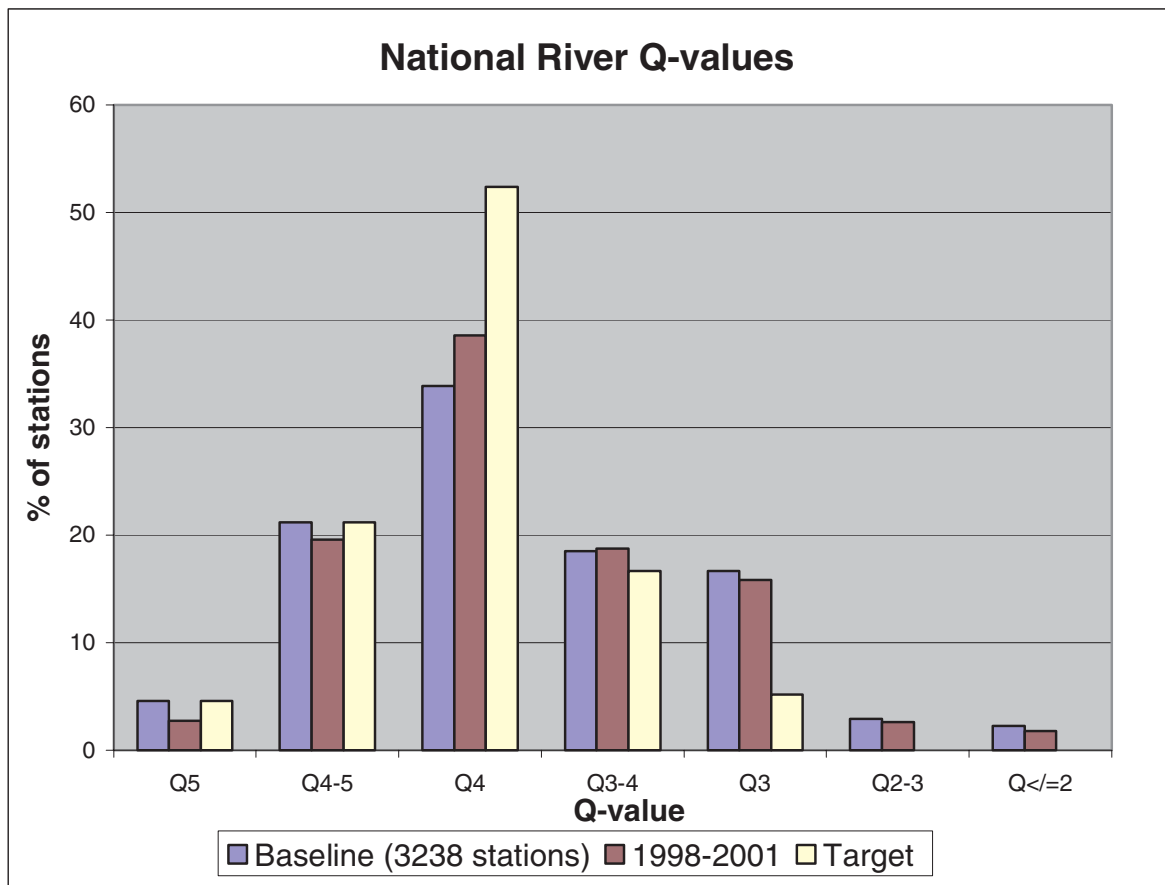


Figure 6 National baseline, 1998-2001 and target data on Q-values at all river monitoring stations monitored for biological water quality.

Table 9 Number and percentage of lakes in each local authority area compliant with the Regulations.

(*Correcting for lakes occurring in more than one local authority area; **The baseline status of 42 lakes in Monaghan, 31 of which are non-compliant and eight compliant, needs to be confirmed by further sampling).

Local Authority	Total number of lakes	Number of lakes resampled	Number of resampled lakes Compliant	% of resampled lakes Compliant
Carlow	0	-	-	-
Cavan	12	12	1	8.3
Clare	27	26	20	76.9
Cork	23	23	17	73.9
Cork City	1	1	0	0
Donegal	48	31	23	74.2
Dublin City	0	-	-	-
Dublin South	0	-	-	-
Dun Laoghaire Rathdown	0	-	-	-
Fingal	0	-	-	-
Galway	81	40	32	80.0
Kerry	8	7	5	71.4
Kildare	0	-	-	-
Kilkenny	0	-	-	-
Laois	0	-	-	-
Leitrim	16	15	10	66.7
Limerick	1	1	0	0
Longford	11	7	4	57.1
Louth	0	-	-	-
Mayo	13	11	9	81.8
Meath	1	1	0	0
Monaghan**	47	44	10	22.7
Offaly	1	0	-	-
Roscommon	9	9	9	100
Sligo	5	4	4	100
North Tipperary	1	1	1	100
South Tipperary	0	-	-	-
Waterford	13	5	3	60.0
Westmeath	12	9	8	88.9
Wexford	0	-	-	-
Wicklow	9	8	6	75.0
Preliminary Total	339	255	162	
Revised total*	321	238	152	63.9

4. Review of Measures Implementation

Implementation programmes were requested from local authorities for:

- a) the functional area as a whole; and,
- b) each river/lake catchment.

The EPA Guidance Notes (EPA, 1999a, 2000a) list an array of measures that are available to local authorities to protect and improve water quality. The measures proposed by the local authorities are separated into five major categories (Table 10):

- Planning, control and enforcement measures including: water quality management planning; planning and control measures for point sources; planning and control measures for non-point sources; and, general enforcement measures;
- Monitoring measures;
- Consultative and Co-operative measures;
- Public education and advisory measures;
- Other agri-environmental and miscellaneous measures.

A total column is calculated in Table 10 to indicate the number of local authorities proposing to apply a particular measure. The Implementation Reports enable local authorities to provide an update on the implementation of measures proposed in the Measures Reports. The Implementation Reports also allow local authorities to re-evaluate proposed measures and alter these, or propose new measures, where experience dictates that the original measures are either no longer necessary or practical. Ultimately, the success or otherwise of measures implemented will be determined by the water quality monitoring results. The local authorities have provided updates on the implementation of a wide range of proposed measures and the main points are discussed below.

Table 10 Measures being implemented or proposed to be implemented by local authorities

(O = ongoing; S = short term, by 2004; M = medium term, by 2006; L = long term, after 2006; NS = timescale not stated; ? = assessing need for measure).

Local Authorities	Carlow	Cavan	Clare	Cork	Cork City	Donegal	Dublin City	DLR	Galway	Fingal	Kerry	Kildare	Kilkenny	Leitrim	Limerick	Limerick City	Longford	Louth
Planning, Control and Enforcement Measures																		
a) Water quality management planning																		
Prepare/implement/review catchment management plans			O			O		S		O	O			O	O			
Groundwater / aquifer protection schemes			O			O		S				M		NS				M
Implement Waste Management Plans			O			O			O									
Implement Sludge Management Plan			M			O			O	NS								
Incorporate water quality plans in County Development Plan			O	O				S										
Improve integration of planning and water quality functions	O		O	O				O	O		O			O	O			O
Establish Environmental Information Management System								O										
b) Planning and Control Measures - point source discharges																		
Issue / Review Section 4 licenses	S	O	O	S		O	O	O	O	S	O	O	NS	NS	M	O		O
Issue / Review Section 16 licenses	S	O	O	S		O	O	O	O	S	O	O	NS	NS	M	O		O
Upgrade/construct WWTPs	O	O	O	O		O	O	O	NS	NS	O	O	O	M	O		O	M
Upgrade surface water and foul sewer collection systems		O	M	O		O	O	O	O	O	O	O	O					
Inspection of non-licensed discharges	S	O	M	S		O	O	O	O	O	O	O	NS	O	O			O
Improve controls on septic tanks	O	O	O					O	S	O	O	O			O			
Review abstractions																		
Farm surveys	O	O	O	O		O	O	O	O	O	O	O	O	O	O			O
Use of wetlands to control phosphorus		O				O												
Upgrade municipal waste facilities		O	O			O		O			O	O						
c) Planning and Control Measures - non-point source discharges																		
Agricultural Bye-laws	S	O		O					?	S	NS				?		NS	
Other relevant bye-law														NS				
Nutrient Management Planning under Water Pollution Act	O	M	O					S			NS			M	O			O
Best farm management planning																		
Improve controls on forestry		O	O	O							O				O			
Controls on peat extraction industry																		
LA reviewing landspreading activities				O								O		NS	O			
d) General Enforcement Measures																		
Active enforcement of Water Pollution Acts	O	O	O	O		O		O	O	O	O	O	O	O	O		O	O
Monitoring Measures																		
Increase hydrometric monitoring programme					S		O		M	O	O	O	O	M				NS
Increase river monitoring programme		O	O	O	O	O	O	O	O	O	O	O	O		O			O
Increase lake monitoring programme		O	O	O	O	O	O	O	O		O				O			
Increase groundwater monitoring			O															
Increase point source monitoring (of WWTPs/industry etc.)	O	O	O	O		O	O	S	O	O	O	O	O		O	O		O
Improve monitoring/laboratory equipment/procedures		O	O	O		S		O	O	O	O	O	O		O			
Establish catchment phosphorus budgets									O	O	O	O	O					
Undertake hot spot catchment studies / pollution investigations	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O			O
Establish database of soil P levels for county																		
Conduct soil surveys of county	M																	
Development/use of GIS for catchment management		L		O				S		O	O	O		O	O			M
Consultative and Cooperative Measures																		
Participation in catchment management committees	O		O	O		O	O	S	O	O	O	O	O	O	O		O	O
Liaison with EPA/LAs/Teagasc/farmers/fisheries/forestry etc.	O	O	O	O	S	O	O	O	S	O	O	O	O	O	O	O	O	O
Public Education and Advisory Measures																		
General public education campaigns	O	M	O	O				S	S	S	O	O	O		O			NS
General public education programmes			O	O	O			S	S	S	O	O	O	O	O			NS
Encourage use of phosphorus free detergents							O											
Appoint environmental Education Officer/Public awareness Officer	O	O	O	S		O		O	O		O	O	O					
Other National Agri-Environmental and Miscellaneous Measures																		
Research relating to agricultural waste management / water quality	O	O	O									O		O				
Promote Agri-environment schemes (REPS, GFP etc.)		O	O	O				O			O	O			S			
Maximise local sources of funding for catchment management																		
Appoint additional staff for Regulations implementation		O		O			NS	O	O	O	O	O	O	O	O		S	NS

Table 10 continued. Measures being implemented or proposed to be implemented by local authorities

(O = ongoing; S = short term, by 2004; M = medium term, by 2006; L = long term, after 2006; NS = timescale not stated; ? = assessing need for measure)

Local Authorities	Mayo	Meath	Monaghan	Offaly	Roscommon	Sligo	South Dublin	North Tipperary	South Tipperary	Waterford	Waterford City	Westmeath	Wexford	Wicklow	Total
Planning, Control and Enforcement Measures															
a) Water quality management planning															
Prepare/implement/review catchment management plans	O	O	O		O	O		O	O			O	NS	O	14
Groundwater / aquifer protection schemes		O	O		O	NS		O	O						15
Implement Waste Management Plans			O		O	O		O	O						8
Implement sludge management plan	O		O	O	O	O		O	O			NS		O	14
Incorporate water quality plans in County Development Plan					O			O							5
Improved integration of planning and water quality functions			O		O				O				O	O	14
Establish Environmental Information Management System															2
b) Planning and Control Measures - point source discharges															
Issue / Review Section 4 licenses		S	O	O	O	O	L	O	O	O	O	O	O	O	29
Upgrade/construct WWTP/sewerage schemes	O	O	O	O	O	O	O	S	O	O	L	O	O	O	26
Upgrade surface water and foul sewer collection systems		S	O		O	O	O	O	O	O				O	29
Inspection of non-licensed discharges	O	S	M	O			O		O		O		M	NS	17
Improve controls on septic tanks		S	S		S	O						O		O	19
Review abstractions		S	O											O	18
Farm surveys	O	S	O	O	O	O	?	O	O	O		O	O	S	2
Use of wetlands to control phosphorus				M	O				O	O		O	O		26
Upgrade municipal waste facilities	O		O		O				O	O	O				6
c) Planning and Control Measures - non-point source discharges															11
Agricultural Bye-laws	NS			O			?	O	?			O			11
Other relevant bye-law	NS														3
Nutrient Management Planning under Water Pollution Act	NS	S				NS	?		O		S				12
Best farm management planning										O				S	3
Improve controls on forestry	NS	S			NS	O		S	O					O	13
Controls on peat extraction industry				O								O			2
LA to review licenced landspeading		S				NS			O					S	8
d) General Enforcement Measures															
Active enforcement of Water Pollution Acts	O	S	O	O	O	O	O	O	O	O	O	O	O	O	29
Monitoring Measures															
Increase hydrometric monitoring programme		O	L				O		O						11
Increase chemical/biological river monitoring	NS	O	O		O	O	O	O	O	O		O		NS	24
Increase lake monitoring programme	NS		O		O	O			O	O		O		NS	14
Increase groundwater monitoring			M				?								3
Increase point source monitoring (of WWTPs/industry etc.)		S	O	O	O	NS	O	O	O	O	O	O	O	O	27
Improve monitoring/laboratory equipment/procedures		S	O	O	O			O	O	O					17
Establish catchment phosphorus budgets		S	O				M								6
Undertake hot spot catchment studies / pollution investigations			O			O		O	O	O	O	O			20
Establish database of soil P levels for county			O					L							4
Conduct soil surveys of county															1
Development/use of GIS for catchment management		O	O			O		O	O				O	S	19
Consultative and Cooperative Measures															
Participation in catchment management committees	O	O		O	O	S		O	O	O		O	O		25
Establish liaison with other parties EPA/LAs/Teagasc/farmers/fisheries etc.	O	O	M	O	O		O	O	O	O	O	O	O	O	31
Public Education and Advisory Measures															
General public education campaigns	O	S	O		S	O	O	O	NS	O	S	O		O	24
Sectoral education programmes		S	O	O	S	O	NS	O	NS		S	O	O	O	23
Encourage use of phosphorus free detergents		S			O										5
Appoint environmental Education Officer/Public awareness Officer	O	O	O	O	O	O		O	O					O	19
Other National Agri-Environmental and Miscellaneous Measures															
Research relating to agricultural waste management / water quality		S	O			NS		O							8
Promote Agri-environment schemes (REPS, OFP etc.)		O		O	O	O		O	O			O	O	S	16
Maximise local sources of funding for catchment management		S													1
Appoint additional staff for Regulations implementation			O	O	O	O		O	O	O			O	O	22

4.1 Planning, Control and Enforcement Measures

4.1.1 Water Quality Management Planning

Water quality management planning is a key measure available to local authorities in the implementation of the Phosphorus Regulations. It is now widely accepted that a catchment-based approach to water quality management is appropriate as set out in Government policy and in the EU Water Framework Directive (WFD). All of the local authorities are or will be involved in water quality management planning through implementation of the WFD. This Directive, which came into force in December 2000, requires Member States to draw up River Basin Management (RBM) Plans by 2009. The aim of these plans will be to provide a holistic approach, within each River Basin District (RBD), to the management of surface inland, estuarine and coastal waters, groundwaters, and terrestrial environments dependant on the aquatic environment. The general aim of the Directive is to prevent deterioration of water status and achieve good water status (as defined) by 2015.

At a national level, the Directive is being implemented through an Inter Departmental Co-ordination Group and a National Co-ordination Group that includes Government Agencies with responsibility for water protection and management. There are a number of Technical Working Groups focussing on national implementation of particular aspects of the Directive such as groundwater and hydrological aspects. Irish representatives also take part in the North-South Working Group on Water Quality, in the UK Technical Advisory Group on the WFD and in the EU Strategic Co-ordination Group (including various technical working groups).

It is intended that eight RBDs will be established in Ireland, north and south (including three cross-border basins). Seven RBDs will be wholly within the south. RBM Projects are to be established in each RBD. The €8.25 million South-East RBM Project commenced in April 2002, and the €7.875 million Shannon RBM Project commenced in November 2002. The DEHLG approved a €8.3 million Eastern RBM Project in April 2003 and approved in principle the €8.3 million Western RBM project in August 2001. Cork County Council is developing proposals for the South-Western RBM project.

Local authorities will have the primary role in promoting, establishing and implementing the RBM Projects. Consultants will play a large role in these projects, reporting to a project Steering Group consisting of representatives of participating local authorities, the DEHLG, EPA, GSI and other government departments/agencies. The projects will also involve an operational committee that will include members from all relevant sectors. The overall objective of the RBM projects is to establish an integrated monitoring and management system for all waters within a RBD, to develop a dynamic programme of management measures and to produce a RBM Strategy for each RBD. The programme of measures will take account of all significant sources of impact on aquatic ecosystems and groundwater. It is envisaged that each RBM Strategy will serve as a major input to the development of RBM Plans, as required by the Directive. These management systems are seen as a step towards implementation of the WFD, which will provide for the ongoing co-ordination and implementation of measures to include the general protection and improvement of aquatic ecology, unique and valuable habitats, drinking water resources and bathing water. In some cases, local authorities have delayed

implementation of proposed measures until the relevant RBM Projects are set up and relatively few local authorities (e.g., Dun Laoghaire-Rathdown, Fingal, Mayo) are currently compiling or reviewing water quality management plans in their own functional area as a result of the anticipated Projects.

Many local authorities have already been involved in the ongoing Water Quality Monitoring and Management Systems (WQMMS) established for Lough Derg / Lough Ree, the Three Rivers Project (for the Suir, Liffey and the Boyne) and Lough Leane (Kerry). Information derived from the WQMMS will ultimately be incorporated into the new RBM Projects. The participation of local authorities in the RBM projects should assist them in achieving the objectives of the Phosphorus Regulations and ensure compliance with the prescribed standards at a local authority level.

The Lough Derg / Lough Ree WQMMS published its final report in April 2001 (KMM, 2001). This report quantifies the improvements expected in water quality as a result of the investment made in wastewater infrastructure and catalogues the actions taken to implement proposed water quality management measures. The report recommends a wide range of measures to protect and improve water quality. The Lough Leane Project published its second interim report in December 2000 (KMM & Pettit, 2000). This report outlines progress made during the second year of the Project; presents the river and lake quality status; identifies and quantifies sectoral contributions within the catchment which impact on water quality; and proposes management measures which require implementation if the water quality of Lough Leane is to be restored to a satisfactory state.

The Three Rivers Project for the establishment of WQMMS for the Rivers Suir, Boyne and Liffey published its final report in 2002 (MCOS, 2002). The DEHLG and the participating local authorities financed this €6 million project, with substantial support from European Union Funds. The Three Rivers Project has developed a monitoring and management system for each of the three catchments, including specific management measures for each of the 45 significant sub-catchments in the project area. This allows particular pressures and impacts of relevance to be identified and appropriate measures applied in a focused and well-targeted manner. The completion of major wastewater treatment plants at Osberstown, Leixlip, Cahir, Carrick-on-Suir, Templemore, Navan, and Trim have made a significant contribution to improved water quality during the course of the project. The report confirms that all sectors contribute to water pollution and, accordingly, all must contribute proportionately to the solution through, for example, best management practice in agriculture, forestry, waste management, urban drainage and urban waste water treatment. The three catchments - Suir, Boyne and Liffey - were brought forward together to achieve significant economies of scale, and considerable technical benefits, by dealing with them as a single project on a co-ordinated basis. Three local authorities jointly administered the project—South Tipperary, Meath and Kildare.

4.1.2 Groundwater Protection Schemes

The interdependency between groundwater and surface waters means that even relatively low levels of phosphorus in groundwater may lead to a problem in surface water if there is significant groundwater baseflow to a river, particularly in times of low flow. Fifteen local authorities propose the preparation / implementation of groundwater protection schemes. The Geological Survey of Ireland (GSI) has completed, or is nearing the

completion of, a number of groundwater protection schemes for various local authorities and is planning to have developed such schemes for much of the country by 2010 (McGarrigle *et al.*, 2002). Groundwater protection schemes provide guidelines for the planning and licensing of activities that could pose a risk to groundwater resources. The schemes provide a land surface zoning map which outlines areas in which groundwater is vulnerable to pollution and areas that have a good groundwater potential. These maps can be used to assess the acceptability of a particular activity with regard to potential hazard and groundwater source protection. The schemes are also a guide in identifying works that should be carried out to protect groundwater sources. Regard should be had to these schemes in the preparation of County Development Plans. The WFD and the setting up of RBM Projects requires vulnerability assessment to be undertaken as well as the delineation of resource and source protection zones. The groundwater protection responses for landspreading of organic wastes and for wastewater treatment systems for single houses put measures in place to reduce the risk of phosphorus entering groundwater (DELG *et al.*, 1999).

4.1.3 Waste Management

All parts of the country are now, for the first time, subject to regional waste management plans and a *National Hazardous Waste Management Plan* (EPA, 2001a). The implementation of these plans must be accelerated, according to the recently published National Waste Database Report (EPA, 2003a). The number of operating local authority landfills has decreased from 76 in 1998 to 50 in 2001, while the number of private sector landfills has decreased from 50 to 42 in the same period, in line with government policy. In addition, operational procedures at remaining landfills have improved as a result of their becoming licensed and regulated for the first time. More transfer stations and material recycling facilities have opened for the processing of waste.

4.1.4 Sludge Management Plans

Fourteen local authorities propose the preparation or implementation of sludge management plans. For example, in Donegal the sludge management plan was formulated based on the guidance notes produced by the DEHLG. It covers all sludge arisings including agriculture, industry and wastewater. It proposes, in the case of wastewater sludge, to thermally dry the sludge producing a granulated baggable biosolid that will have a preferential use in the agricultural or horticultural sector. However, recognition is given in the plan to the fact that these sectors may not be available long term as a disposal route for various reasons and that the thermally dried product has potential as a feedstock in an incineration process. This process of sludge incineration is the preferred route in the north of Ireland with whom there is a close affinity. Teagasc provided very valuable input in calculating the sludge arisings from agriculture.

In Fingal, the sludge management plan identified that the high dependence on inorganic fertilisers is creating a large surplus of phosphorus. The plan recommends that nutrient management planning and the regulation of organic and inorganic fertiliser be implemented throughout Fingal. Draft bye-laws are being prepared to address this issue and it is intended that there be liaison with Teagasc and the IFA to determine the most appropriate method to reduce levels of fertiliser used. In Offaly the sludge management plan has established a phosphorus balance for the functional area of the local authority based on a river catchment basis. In the context of recommendations in the plan relating

to landspreading and increased sludge production over the coming years, management procedures will be introduced to effectively limit phosphorus inputs to surface water bodies and to ensure disposal of sludge in a sustainable manner.

The Roscommon sludge management plan proposes sludge reception centres at Monksland, Boyle, Castlerea, Roscommon and Ballaghadereen. The centre at Roscommon will also form a hub treatment centre. Sludge arising from small plants will have onsite treatment. The Council is having regard to the plan in the preparation of the County Development Plan.

4.1.5 Planning and Water Quality

Fourteen local authorities propose closer integration of the planning process with responsibilities for protecting water quality generally, through strengthening the referral process between the Planning and Environment sections of the local authority. Environment Sections now frequently receive any planning applications that involve environmental emissions for consideration. Five local authorities indicate that water quality management plans will be included in the County Development Plan.

The Planning Department in Cork County Council refers planning applications for housing estate developments to the Environment Department for consideration at the planning stage, prior to their requirement for a water discharge licence under the Water Pollution Act. This allows the application to be reviewed more fully in terms of the Phosphorus Regulations particularly in relation to housing density, treatment facility requirements and the capacity of the receiving waters. Limerick County Council has included a section in the new planning application guidance document which highlights the need for certain new developments to apply for discharge licences prior to construction.

Consultants have been commissioned to produce a FÁS training programme for the introduction of Environmental Management Systems (EMS) in local authorities, with South Tipperary being used as the pilot local authority for the development of this programme. The EMS will be initially implemented in the Planning and Environment Section. The development of the training programme was supported by a committee chaired by South Tipperary, with representation from the DEHLG, FÁS, EPA, Cork County Council and SIPTU. It has been designed to assist local authorities in implementing the EU EMAS (Environmental Management and Audit Scheme) Regulation.

4.1.6 Discharge Licensing and General Enforcement

The majority of local authorities specifically indicate that they will make greater use of powers under the Water Pollution Act in issuing, enforcing and reviewing section 4 and section 16 discharge licences, and in issuing and enforcing section notices to prevent pollution. Many local authorities have already made progress in reviewing discharge licences (Table 11). Local authorities are now ensuring that discharge licences contain a condition limiting phosphorus discharge. Some local authorities have issued a significant number of Section 12 notices, though relatively few local authorities have reported taking legal action against polluters. Twenty-one local authorities have proposed carrying out surveys for unlicensed discharges and progress is being made in

certain areas towards licensing of smaller businesses such as service stations (Kildare) and car wash discharges (Meath). South Tipperary has conducted surveys of sheep dips and quarries in the county.

Cork County Council state that one of its objectives is to check compliance with 200 historical Section 12 and Section 23 Notices issued, and effect closure on files. Cork County Council require all new discharge licences to submit operating procedures and training requirements for staff involved in effluent control to reduce the quantity and improve the quality of waste effluents at source, preferably by the introduction of clean technology and BAT (Best Available Techniques).

In Kildare, each trade and sewage effluent discharge to a water body or wastewater treatment system is assessed with particular attention given to the phosphorus loading from the particular activity. The receiving water body or wastewater treatment system is also assessed to determine the potential impact this loading is likely to have. Where it is deemed necessary, in order to maintain or improve water quality, for certain measures to be taken, instructions are given to the party responsible to carry out these measures. In some cases this has included the installation of phosphorus removal as part of the effluent treatment process. Other licensees have installed process instrumentation, including flow meters and automatic samplers. Sampling and on-site inspections of all licensed activities are carried out in accordance with the Council's annual monitoring programme so as to ensure that the performance of these activities is monitored on a regular basis. Where activities are identified as high-risk in relation to eutrophication potential the frequency of site inspections and discharge monitoring is increased. This ensures that the licensee is aware that pollution is potentially being caused and that measures are required to reduce phosphorus outputs. Where it is found that the quality of a trade or sewage effluent discharge does not meet the requirements of the licence a letter is sent to the licensee outlining the non-compliance and requesting action to be taken to ensure full compliance in the future. The policy of the Environment Section is to work closely with all licensed activities on all environmental matters, as significant progress can be achieved in this way.

South Tipperary had intended to licence all non-domestic discharges to sewer. However, the Council has stated that the recently introduced National Water Pricing Framework will take into account all general as well as significant non-domestic discharges to sewer. This is both from the point of view of charging in line with the Polluter Pays Principle and in requiring the customer to comply with any reasonable direction issued by the local authority. A working group has been set up to implement this policy and the implications for licensing will become clearer as implementation progresses.

Table 11 Selected actions undertaken by local authorities in July 2000- July 2002 period to improve water quality

(based on numerical data submitted in local authority Implementation Reports)

* since 1998; ** since 1999.

Local Authorities	Car-low	Cavan	Clare	Cork	Dublin City	Gal -way	Kerry	Kil-dare	Kil-kenny	Long-ford	Leitrim	Lime-rick	Meath **	Mon-aghan	North Tipp.	Offaly	Ros-common	Sligo	South Tipp.	Water-ford City	Water-ford Co.*	West-meath	Wex-ford	Wick-low
Section 3s issued													2									8		4
Section 3 prosecutions			2										1											
Section 4s Issued			6		1			2				2	21			3			6					11
Section 4s Reviewed						80		8				4		11		5	3		5	5	4	11	49	3
Section 4 prosecutions			5									1												
Total active			32																					
Section 4s																								
Section 10s Issued																								
Section 16s Issued					58			10				7	2			3	3		6					
Section 16s Reviewed								8				7							5		4	4		
Section 16 prosecutions								1																
Farm Surveys			241	1,967		101			100		57			123	850	110	47	113	136		12	127	57	
Section 12 Warnings Issued			58	926																				
Section 12s Issued			96	118		4	42	13		800		69	59	4	28	18			17		12	81	7	11
Section 12 prosecutions			5																		2			
Section 23s Issued			9	35								25			24				48				7	
Section 23 prosecutions			3																					
Legal action (total)			15				3	1				14	7	1										
Septic tanks surveyed												20						150						
Nutrient Management Plans requested under Sn 21A WPA	1	6	2	18		1						2				34		2					1	
Misconnection/con nections surveys					3,966																			
Other investigations							171												48		97			

4.1.7 Waste Water Treatment

Significant progress is being made nationally in the area of waste water treatment, due to the increased level of funding made available by the DEHLG for capital works. Under the National Development Plan (NDP), €3.81 billion will be invested in the provision of wastewater infrastructure in the period 2000-2006. Most local authorities are taking into consideration the requirements of the Phosphorus Regulations when preparing their priority list for schemes to be undertaken. Almost all local authorities propose the construction or upgrading of wastewater treatment plants (WWTPs), with most of these proposing the installation of phosphorus removal facilities at a number of plants in their functional area.

Approximately 17 per cent of WWTPs (serving above 500 population equivalents) discharging to sensitive waters (as defined in the Urban Waste Water Treatment Regulations, 2001) have nutrient reduction facilities (EPA, in press). WWTPs incorporating phosphorus removal have been installed in a number of locations including in the Shannon, Boyne, Liffey, Suir and Lough Leane catchments in the late 1990s due to particular eutrophication problems in these areas. Eutrophication may remain a problem in many rivers and lakes unless phosphorus removal facilities are incorporated in plants. The installation of phosphorus removal at WWTPs in Tuam and Castlebar has resulted in significant improvements to water quality in the Clare River and Lough Cullin respectively (McGarrigle *et al.*, 2002). Thus, there is a strong case for the incorporation of phosphorus removal on all significant treatment plants discharging to inland waters (Toner, 2000; Stapleton and Clenaghan, 2000).

It is also worth noting that reduction in water quality due to discharges from ineffective WWTPs remains a problem in many areas. In a review of the performance of selected sewage treatment plants the EPA has noted that poor performance and overloading of plants may continue to cause water quality problems even where phosphorus removal is installed (McGarrigle *et al.*, 2002). Even some of the new plants constructed in the Shannon catchment have experienced problems, including excessive industrial loadings and lack of capacity to deal with storm waters (KMM, 2001).

There has been considerable work undertaken by many Councils in providing collection and treatment systems for villages not currently seweraged and in upgrading collection systems (e.g., Cavan, Cork). Dublin City, South Dublin and Fingal report that the Greater Dublin Drainage Strategy is having a positive impact on water quality in their functional areas e.g., through the diversion of the Saggart, Newcastle and Ashbourne foul sewage effluents to the Dublin Drainage System. Ringsend WWTP now provides treatment for all the domestic and industrial wastewater from the entire Dublin region.

Since 1997 all local authorities have received an annual grant under the Small Water and Sewage Scheme Programme. The grant covers 75% of the cost of each scheme with the remaining 25% being met by local authorities, generally with funds accumulated from planning levies.

4.1.8 Drainage Systems

The main sources of nutrients in urban areas include run-off from paved areas, roadsides, gardens, and parks. Atmospheric deposition, domestic animal faecal waste, litter fall, traffic and chemical fertilizers/pesticides can be present in these discharges. In addition, there may be misconnections between foul and surface water drainage systems.

Seventeen local authorities propose to survey and upgrade surface water and foul sewer drainage systems to effectively manage urban runoff and to rectify misconnections. Dublin City report significant progress in the implementation of this measure (Table 11). The Main Drainage Division has carried out successful surveys of misconnections to and from surface water systems in housing estates in the Camac, Santry and Tolka River catchments. Two three-man crews survey housing estates for misconnections of wastewater to the local surface water systems (e.g., washing machines / dishwashers / sinks). Where misconnections are confirmed the householders are written to and requested to correct the problem. Of 3,966 inspections carried out, 354 misconnections were found, with 317 of these having been corrected to date. The survey programme is ongoing and will be extended to industrial estates in the 2003-2007 period.

In Dun Laoghaire-Rathdown misconnection surveys have recently been strengthened by the appointment of a pollution engineer. Of 112 houses recently visited access was gained to 86, twenty-three of which were found to have misconnections. Rectification of the faulty connections is proceeding. Homeowners are encouraged to remedy the situation before prosecution under Section 12 of the Water Pollution Act is considered.

South Dublin has appointed an Inspector with the sole purpose of carrying out a misconnections survey within the county. Initial monitoring results have indicated that much of the phosphorus loading to rivers within South Dublin originates in urban areas. Therefore, a misconnections survey of all premises within catchments of unacceptable water quality will be carried out, eventually extending the survey to the rest of the county. The misconnection rate is approximately 8.4 per cent based on current monitoring.

The drainage networks in the Dublin area are being modelled under the Greater Dublin Strategic Drainage Study which should identify sub-standard sections in need of upgrading. The study will assess all aspects of the drainage system in order to optimise the capacity of the system to cater for increased development in the region while avoiding any adverse environmental impact. The Study Area includes all the Dublin local authority areas as well as Kildare, Meath and Wicklow. Substantial work was completed last year in Swords (Fingal) upgrading sewers and diverting surface water.

A number of misconnection surveys have been carried out in Kildare. Work is also being carried out in relation to the levels of fats, oils and grease entering sewer networks, particularly from premises involved in food preparation. Wicklow has carried out a review of 16 surface/foul water networks. Wicklow encourages the screening of combined storm overflows and discharges from storm water drainage systems, as well as (or in association with) the use of storage impoundments and the provision of treatment systems for dirty water effluents.

Dun Laoghaire-Rathdown is currently implementing Sustainable Urban Drainage System policies within urban developments. SUDS are an alternative to the conventional piped surface water drainage systems and provide an integrated approach towards urban runoff management. SUDS are surface water drainage methods that take account of the quantity, quality, amenity and habitat enhancement issues. SUDS minimise the impacts of urban runoff by capturing runoff as close to the source as possible and then releasing it slowly. The use of SUDS to control runoff also provides the additional benefit of removing pollutants in the drainage water by settling out solids and in some cases providing biological treatment (MCOS, 2002).

4.1.9 Septic Tanks/Single House Treatment Systems

Septic tanks are estimated to contribute approximately 12 per cent of the total annual phosphorus load to Lough Derg (KMM, 2001); 12 per cent to Lough Leane (KMM and Pettit, 2000); and 3 per cent to the Liffey, 7 per cent to the Suir and 8 per cent to the Boyne (MCOS, 2002). Eighteen local authorities have proposed controlling septic tanks mainly through the planning process and through survey and assessment. EPA guidance documents on Treatment Systems for Single Houses (EPA, 2000b) and Treatment Systems for Small Communities, Business, Leisure Centre and Hotels (EPA, 1999b) are being used extensively by local authorities in the assessment of planning applications and in supervision of the design, operation and maintenance of treatment systems, including septic tanks.

Wicklow inserts a maintenance clause for all private small scale treatment systems in planning permissions which requires the annual inspection and servicing of septic tanks. The clause requires that the operators of the proposed development shall enter into a contractual service agreement with the supplier or manufacturer of the sewage treatment plant to ensure that it achieves optimum performance throughout the lifetime of the development. A copy of the signed agreement is then forwarded to the local authority for approval. Similarly Carlow inserts a maintenance clause for all small-scale treatment systems in planning permissions, which also requires details of final sludge disposal.

Cavan has reviewed the planning process in relation to septic tanks and the type and number of septic tanks that can be installed in sensitive areas is now limited. The Council has drafted bye-laws on the operation and maintenance of single dwelling treatment systems. Kerry plans to include appropriate standards for the installation and operation of private on-site wastewater treatment systems in the forthcoming County Development Plan. Leitrim states that the soils in that county do not lend themselves adequately to the attenuation of septic tank effluent. A pilot project has been undertaken to find the best alternative. Louth requires percolation trial hole observations (and random percolation testing) for all domestic sewage/effluent disposal planning applications. Westmeath has implemented a planning policy that single house dwellings in close proximity to watercourses or sensitive areas shall install a wastewater treatment system capable of treating the wastewater to a standard of 20mg/l Biological Oxygen Demand and suspended solids of 30mg/l prior to percolation.

In recent years Limerick County Council has required, in planning permissions, that proprietary treatment systems be installed on all sites deemed unsuitable for conventional septic tank systems. Limerick County Council has conducted a survey of twenty properties that have proprietary treatment systems installed, to assess the performance of

these systems, to identify any problems and to check compliance with planning conditions. Poor construction of percolation areas was a recurring problem.

A special study conducted in the Lough Leane catchment, Co. Kerry, on septic tanks has found that septic tanks are rarely, if ever, desludged and that regular maintenance or inspections are not carried out. Many tanks fail to meet minimum capacity requirements for single dwellings and nearly half of the percolation tests failed to meet minimum requirements. The Local Authority had no system for verification of percolation tests and did not carry out follow-up inspections to ensure that septic tanks and percolation areas meet standard requirements (KMM and Pettit, 2000). It is likely that these problems are not restricted to Kerry and that these findings would apply to most parts of the country. FÁS, in conjunction with the EPA and the GSI, is currently running a training course for professionals in this area to address many of these problems.

4.1.10 Abstractions

Three local authorities propose reviewing abstractions but little progress has been made with this measure to date. Under the Local Government (Water Pollution) Acts 1977-90, local authorities are required to maintain registers of abstractions in their functional area. Local authorities need to pay greater attention to water abstraction and its potential environmental impacts such as the reduction in assimilative capacity of a surface water body.

4.1.11 Agricultural Bye-laws

Five local authorities (Cavan, Cork, Offaly, North Tipperary and Westmeath) have introduced bye-laws under Section 21 of the Local Government (Water Pollution) (Amendment) Act, 1990, to control agricultural activities (Table 12). Bye-laws may be adopted for individual catchments/townlands or for the entire county as required. Agricultural bye-laws adopted by the five local authorities to date relate to specific listed townlands. Offaly has also applied the bye-laws to the aquifer protection zones of all public and private groundwater sources within the county. A further six local authorities have proposed introducing agricultural bye-laws and four additional local authorities are assessing the need for them (Table 12).

Table 12 Local authority implementation of agricultural bye-laws as reported in local authority Implementation Reports.

Ongoing	By 2004	Timeframe not stated	Assessing need for Bye-laws
Cavan, Cork, Offaly, North Tipperary, Westmeath	Carlow, Fingal	Kerry, Longford, Mayo, Sligo	Galway, Limerick, South Dublin, South Tipperary

The main provisions contained in the published agricultural bye-laws vary somewhat between local authorities (Table 13). The Cork bye-laws were introduced over a year before the bye-laws in the other local authorities and have significantly different

requirements. However, marked differences exist between the bye-laws of the latter four counties as well. For example, different winter storage capacities are required for manure in each county, varying from three months in Cork to up to 24 weeks in Cavan. The timing restrictions on landspreading of this manure also vary between local authority area.

The information to be included in nutrient management plans under the Cavan, Offaly, North Tipperary and Westmeath bye-laws is more detailed than the information specified in the Cork bye-laws. The former four local authorities require information on matters such as:

- a) current and proposed land use;
- b) estimate of nutrients to be applied annually to land;
- c) soil nutrient levels;
- d) specification of maximum quantities of organic and chemical fertiliser that ought to be used on the land;
- e) times when organic and chemical fertiliser ought or ought not to be applied to land; and
- f) keeping of monthly records relating to livestock, the production, treatment, receipt from or transfer to another person of organic fertiliser, and the types, quantities, timing locations and rates of application of chemical fertiliser.

Cavan, Offaly, North Tipperary and Westmeath also require reports on farm effluent storage capacity and detailed reports similar to that outlined above from intensive agricultural enterprises (IAEs). Under the Cork bye-laws information is required on soil nutrient tests and organic and chemical fertiliser use only. Whereas the application of nutrients to land is dependant on the farm nutrient management plan (after one year) in Cavan, Offaly, North Tipperary and Westmeath, the Cork bye-laws actually specify the soil nutrient conditions under which phosphorus may be applied to lands (Table 13). The soil testing regime is specified in the Cork bye-laws, but only applies to farms in excess of 20 ha in size and to smaller farms which are IAEs. The bye-laws of Cavan, North Tipperary and Westmeath state that the soil testing regime is to be specified by the local authorities concerned but there is no size limit on the farms to be tested. There is no specific provision in the Offaly bye-laws relating to soil testing. The Cork bye-laws contain additional provisions for a phosphate sales register by retailers, controls on nitrogen fertiliser and the provision that the local authority must be notified before organic fertiliser is imported on to a farm. Burial of animals is controlled under the Westmeath and Offaly bye-laws. In Cavan, Offaly, North Tipperary and Westmeath enterprises with Integrated Pollution Control licences or farmers engaged in REPS are exempt from the agricultural bye-laws.

Cavan has implemented its bye-laws in the Lough Sheelin catchment and they report that there has been a good response in general to the initial phase of the introduction of the bye-laws. Approximately 10 per cent of farmers have shown a reluctance to co-operate. Cavan state that the bye-laws may be extended to other areas, following full consultative procedures, if water quality monitoring indicates that the bye-laws are a success.

Cork is enforcing bye-laws in the Funshion, Gradogue and Lee catchments. A major publicity campaign was carried out in 2000 with 6000 information packs printed and circulated in the period 2000 — May 2002. Bye-law enforcement was suspended for the period July 2001 — July 2002 due to loss of staff. Implementation of the agricultural

bye-laws has resulted in an intensification of farm survey work in the areas where the bye-laws apply in Offaly. This has resulted in recruitment of staff (e.g., three technical staff in Offaly).

North Tipperary has employed an Environmental Scientist and an Agricultural Scientist to implement and enforce the Agricultural Bye-laws. The bye-laws regulate approximately 645 farmers, farming 40,000 ha. 82 per cent of farmers have either nominated an advisor (to draw up a phosphate control plan) or notified the Council that they are in REPS. The local authority has approved seventeen advisors. 112 plans have been submitted and are presently being assessed. 28 per cent of farmers are currently fully compliant with the bye-laws. It is proposed that at least 10 per cent of farms per year will be inspected to confirm compliance. Implementation of the bye-laws was delayed by the foot and mouth outbreak and identification of all persons farming land in the area covered by the bye-laws has been difficult and time-consuming.

Kerry has prepared draft agricultural bye-laws for the Lough Leane Catchment. Mayo has drafted agricultural bye-laws following wide consultation but these await adoption by the Council. Limerick is trying a co-operative approach with farming organisations in the Bunoke catchment to tackling farm pollution. If this works it may obviate the need to bring in agricultural bye-laws. An Agricultural Bye-laws Working Group has been constituted in 2001-02 which includes Kerry, North Tipperary, Cavan, Westmeath and Limerick County Councils. Local authorities that have implemented bye-laws or intend to introduce bye-laws meet to discuss progress, findings and the various issues encountered in the implementation of the bye-laws.

A number of local authorities are holding back on the introduction of bye-laws until the national picture as regards implementation of the Nitrates Directive has been clarified (e.g., Limerick). The Government has indicated that further implementation of the Nitrates Directive will involve an action programme, including Regulations, which will be applied to the whole country and which will provide statutory support for the application of established standards of good agricultural practice. Those local authorities that have already introduced bye-laws may have to re-examine the bye-laws in the light of the action programme. The action programme now being developed will include limits on the amount of organic nitrogen that may be applied to land. A general limit of 210 kg/ha of N will operate for the first four years as allowed by the Directive. The Government will utilise the derogation provisions of the Directive to seek approval from the European Commission of a derogation for nitrogen limits of up to 250 kg/ha N per annum for Ireland. In the absence of agreed derogations, the Directive requires that a standard general limit of 170 kg/ha N be applied. The detailed provisions of the action programme and related research and monitoring programmes will be finalised in 2003 in consultation with the main farming organisations and other interests.

Table 13 Main provisions of agricultural bye-laws introduced by local authorities.

Provision	Cavan	Cork	Offaly	Nth Tipperary	Westmeath
Date of issue	1 Jan 2001	15 Oct 1999	16 July 2001	1 Jan 2001	1 March 2001
Livestock manure storage	24 weeks storage within 3 years	Three months storage – with immediate effect	14 weeks storage with 4 years	16 weeks storage within 3 years	20 weeks storage within 3 years
Report on farm effluent storage capacity to LA	Within 6 months		Within 12 months	Within 12 months	Within 6 months (extended to 12 months due to foot and mouth)
Controls on farmyard effluents	Yes	Yes	Yes	Yes	Yes
Landspreading of manure	50% by 31 July All by 30 Sept	All by 31 Oct	50% by 1 July All by 30 Sept	50% by 1 July All by 30 Sept	50% by 1 July All by 30 Sept
Controls on application of fertiliser	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use	Buffer zones specified for use of organic fertilisers	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use
Phosphate Sales Register		Retail outlets selling P fertilisers in bags \geq 50kgs			
Nutrient Management Plans	Detailed plan required. Within 9 months	Records to be made of organic and chemical fertiliser use. With immediate effect	Detailed plan required. Within 12 months.	Detailed plan required. Within 12 months	Detailed plan required. Within 6 months (extended to 12 months due to foot and mouth)
Nutrient Management Plan requirements	Farmer shall not apply nutrients after one year save in accordance with NMP	Chemical phosphate application prohibited on lands where Morgans P \geq 15mg/l or where Morgans P \geq 30mg/l on peat soils Imported organic fertiliser prohibited on lands where Morgans P \geq 15mg/l	Farmer shall not apply nutrients after one year save in accordance with NMP	Farmer shall not apply nutrients after one year save in accordance with NMP	Farmer shall not apply nutrients after one year save in accordance with NMP
Nutrient Management Plans records	Detailed records required.	Records to be made of organic and chemical fertiliser use.	Detailed records required.	Detailed records required.	Detailed records required.
Soil testing	All farms. Rate to be determined by LA	For all farms >20ha and all IAEs Rate generally \leq 4 ha / sample (or \leq 12 ha / sample if soil uniform)		All farms. Rate to be determined by LA	All farms. Rate to be determined by LA
Intensive Agricultural Enterprises (IAE)	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP	Imported organic fertiliser prohibited on lands where Morgans P \geq 15mg/l	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP
Intensive Agricultural Enterprises (IAE) records	Detailed records required.	Records to be made of organic and chemical fertiliser use.	Detailed records required.	Detailed records required.	Detailed records required.
Controls on importation of organic fertiliser		Yes – must notify LA			
Controls on application of organic and chemical nitrogen		Yes – timing and rate of application specified			
Burial of animals			LA consent required		LA consent required
Applies to:	Specific Townlands	Specific Townlands	Specific Townlands and Aquifer Protection Zones	Specific Townlands	Specific Townlands

4.1.12 Nutrient Management Planning under Water Pollution Act

Nutrient management planning is an assessment of the quantities of manure, slurry or inorganic fertiliser that should be applied to a field area, based on nutrient status of the soil, crop to be grown and the nutrient content of the proposed fertiliser, so that target crop yields are achieved and losses to the environment are minimised. Guidelines on the preparation of nutrient management plans have been issued to local authorities (DELG, 1998b). Teagasc through its Farm Advisory Service promotes nutrient management planning. Some local authorities are implementing nutrient management planning through the introduction of agricultural bye-laws (see above). Nutrient management planning is being applied through REPS and it is obligatory in respect of EPA licensed intensive pig and poultry units.

Local authorities also have statutory powers under Section 21A of the Water Pollution Act to require farmers to prepare nutrient management plans where these are considered necessary to protect water quality. Under the Nutrient Management Consultation Regulations, 1998 (S.I. 257 of 1998) local authorities must consult with the EPA before serving a notice on a farmer requiring preparation of a nutrient management plan. Nine local authorities have consulted the EPA to date, but only Cork and Offaly have used this power to any significant extent (Table 11). Offaly used this power in 1998 to require nutrient management plans in source protection zones surrounding groundwater sources vulnerable to contamination (prior to the introduction of the bye-laws in Offaly). Cork has used it in connection with farms adjacent to public water supplies.

Clare intends to require all intensive farming activities (piggeries and poultry rearing facilities below the EPA Integrated Pollution Control licensing thresholds) to prepare Nutrient Management Plans. Kildare is planning to review all landspreading activities, which require permits under the Waste Management Act, 1996 and Regulations made thereunder, within the Barrow, Boyne and Liffey catchments. A file on each activity will be prepared to include details of landbanks used for spreading, methods of application, nutrient management plans and detailed records of landspreading. South Tipperary is mapping piggery and mushroom spreadlands and requiring nutrient management plans. Good farming practice will be advised at all times when dealing with the farming community. Louth requires that all planning applications that involve animal slurry disposal or storage must provide a nutrient management plan for disposal of such slurries/manure. Limerick has reported that enforcement of nutrient management plans has proved problematic, with some farmers continuing to spread on severely over-enriched land.

The Agency considers that effective nutrient management planning is a key measure to meet the targets set in the Regulations. This is because many soils in the State are believed to contain phosphorus levels that would be considered excessive and likely to pose a threat to water quality. Despite a decrease in sales of chemical P fertiliser nationally, soil P levels are continuing to increase: approximately 24 per cent of soils analysed by Teagasc contain P levels in excess of that needed to produce suitable crop yields. It has been estimated that there is a surplus of between 48,000 and 60,000 tonnes of P applied to farmland each year (Brogan *et al.*, 2001) with a resulting expenditure of over €30 million a year on unnecessary chemical fertiliser application. It is important to note that for any given level of fertiliser P inputs (organic and chemical), the potential for P losses to water will be higher for soils with high P status than for soils with lower P

status. It has been recommended that soil phosphorus levels should be maintained at the lower end of Teagasc's 'Soil Index 2' if good water quality is to be achieved (Tunney *et al.*, 2000). Problems also arise through the over application of animal manure slurries, and their misapplication, e.g., by spreading during wet weather, which poses a direct threat to water quality. Teagasc has issued nutrient advice on appropriate phosphorus application (Teagasc, 2001) and codes of good agricultural practice have been published (DAFF and DoE, 1996; DAFRD, 2001). Nutrient Management Planning takes time to implement and it may be a number of years before measurable improvements in water quality are achieved through this measure.

4.1.13 Farm Surveys

Farm surveys to locate point and non-point sources of pollution are proposed by twenty-six local authorities. These surveys will generally be used to determine high risk farms / activities and to focus appropriate measures in these areas. Most local authorities are concentrating their farm surveys in catchments where water quality is unsatisfactory or where water quality may be at risk as a result of farming activities. Clare categorises farms into high, medium and low risk entities on the basis of infrastructure, on-site management and vulnerability to groundwater or surface water pollution. Where farms are identified as high or medium risk, Clare issues notices under Section 12 of the Water Pollution Act, 1977-1990.

Kildare has conducted farm surveys in the River Graney catchment, a sub-catchment of the Barrow. Prior to the farm surveys commencing a standard information leaflet was prepared and distributed to farm holdings throughout the Graney catchment. This outlined the reasons behind the farm surveys and gave names and contact telephone numbers in the local authority so the farmer could arrange a suitable time for the survey to be carried out. A farmyard assessment form based on the Three Rivers Project recommendations is used to gather information on the day of the farm survey. Based on the findings of the survey it is then decided what course of action is required, if any, in each case. Where it is found that farm waste management practices at a farm present a threat of water pollution, the farmer is instructed to contact his agricultural advisor to make recommendations on how this threat can be minimised. Staff in the Environment Section discuss these recommendations with the advisor and the farmer to develop a realistic work programme and a timeframe for its completion. As a key element in meeting the targets of the Regulations will be improvements in on-farm management of waste, nutrient management planning will be an important implementation measure. In certain cases a Section 12 notice will be served on the farmer. The actual time it takes to carry out the farm survey, liaise with the agricultural advisor and follow up on their recommendations with the farmer is significant. Therefore Kildare plans to review its approach to surveys to determine where improvements can be made. Prior to farm surveys commencing in any sub-catchment, a meeting will be held with representatives of the IFA and Teagasc working in the area to explain the purpose of the farm surveys and to ensure that these bodies are aware that the surveys are being carried out.

Laois undertook a study of two small catchments, one a grassland area and the other a tillage area. Teagasc and the IFA provided the local authority with substantial support in establishing these two catchments and advertisements were placed in parish newsletters informing farmers of upcoming farm surveys and local authority contact details. The appointment of a technician with agricultural expertise also proved very beneficial. The

conclusions reached from both studies identified farmyards as contributing a significant proportion of total farm exports to watercourses. The establishment of a monitoring programme on the two main channels in Laois (Rivers Nore and Barrow) where extra monitoring is carried out, followed up with farmyard surveys is now seen as being the best approach to take. Information obtained in the farm surveys include storage capacity for waste, method of waste disposal, amount of land farmed, animals held, type of farming activities undertaken and whether the farmer imports or exports any material. Laois has identified that staff working in small well-defined areas and developing an effective working relationship with the farming community will make the most progress. Farmers tend to relate much better to river sampling points in their own locality.

Waterford County Council has surveyed twelve farms in the Ballyshonnock Lake catchment and developed Best Farm Management Plans in eight of these (the other four being REPS farms). Roscommon reports carrying out 41 farm surveys, 16 of which were medium-high risk. Wicklow has appointed an agri-consultant to undertake farm surveys in the county. The initial phase of the work is to undertake farm studies in a pilot area, the Potter's River catchment. It is intended that the pilot will be used for developing a farm survey methodology and questionnaire that can be utilised for the rest of the county. A series of public meetings were held by way of an introduction to the pilot project and talks were held with the IFA and various farming organisations to outline the objectives of the project and enlist their support. It is estimated that 50-60 farmers within the Potter's catchment will be participating in the pilot study. Once the farm surveys have been undertaken for all of Wicklow, it is anticipated that the information would be put in a database, the Catchment Envisage system, which would provide Wicklow with records suitable for reporting and auditing.

Farm surveys are also being undertaken with respect to enforcement of the agricultural bye-laws. Cork, North Tipperary, Offaly and Westmeath all report significant progress in the implementation of this measure. Other local authorities reporting significant farm survey work include Galway, Kilkenny, Monaghan, Sligo and South Tipperary (Table 11). There is evidence that where farm surveys are being carried out there is an increase in demand for Teagasc farmyard renovation plans, making this a very effective strategy (Sean Regan, Teagasc, pers comm.). The significant developments in farm surveys since the last National Implementation Report are very welcome and will hopefully lead to documented improvements in water quality in the targeted catchments.

4.1.14 Forestry

Thirteen local authorities have proposed measures to assess and control the impact of forestry on water quality. In certain cases, these measures include, significantly, prohibiting or discouraging aerial fertilisation of forest plantations. The Forest Service has published a National Forest Standard which includes a Code of Best Forest Practice, embracing Forestry Guidelines (on fisheries, landscape, biodiversity, harvesting etc.) and criteria for sustainable forest management (Forest Service, 2000). The Forest Service is currently sponsoring research into compliance with the Forestry and Aerial Fertilisation Guidelines.

The Forest Service, in partnership with the County Councils, is developing Indicative Forest Strategies for each county in Ireland. The strategies will be used for forest planning purposes and will guide the location and character of future afforestation. In

this context it is worth stating that the EPA has noted significant negative impacts from forestry in many catchments (e.g., Clabby *et al.*, 2002).

In Cork, the Planning Department refers applications for forestry establishment and felling to the Environment Department. These applications are reviewed in the context of potential impacts of operations on watercourses. The annual aerial fertilisation programme is discussed with Coillte. In Donegal, the annual aerial fertiliser programme for each season was obtained from Coillte as had been agreed and a number of sites have been chosen to evaluate the effect, if any, on nearby watercourses.

In Wicklow, Coillte informs the local authority in advance of any aerial fertilisation or pesticide programmes to be undertaken, forwarding all details complete with maps to the planning department of the Council prior to commencement. Maps of restricted zones of application are also produced. Coillte monitors water quality in affected areas, and carries out liaison with the Council when any water quality problems occur. Mayo has drafted bye-laws to control forestry activity.

4.1.15 Peat Extraction

Two local authorities propose measures to control the impact of the peat extraction industry on water quality. Westmeath is currently working with peat extractors in the River Inny catchment to prevent peat siltation of the river. Offaly is in ongoing consultation with Bord na Mona.

4.1.16 Constructed Wetlands

Six local authorities propose wetland/reedbed construction to tackle pollution from point and non-point sources. There is an increase in the number of constructed wetlands being developed to treat wastewater from individual household, small communities and more recently agricultural dirty water. Constructed wetlands require planning permission and also a water pollution discharge licence from the local authority. When sited, designed, constructed, operated and maintained in accordance with best practice taking into account risk to groundwater and the effluent quality being discharged to surface water, then constructed wetlands may lead to improved water quality. The conditions of the water pollution discharge licence should include monitoring to determine the effectiveness of the wetland in relation to phosphorus removal.

Dublin City reports that the construction of a wetland in the Tolka Valley Park was completed in 2000 and has resulted in a very noticeable reduction in phosphate inputs to the Tolka from the Finglaswood Stream. Roscommon has constructed four reed beds to reduce phosphorus inputs from small scale urban agglomerations. Waterford has collaborated with the National Parks and Wildlife Service, DEHLG, in trials on constructed wetlands for treating farm soiled water and sewage in the Dunhill River catchment special study area. Twelve wetlands are currently in operation in the catchment and results are promising.

4.2 Monitoring Measures

4.2.1 River, lake and facilities monitoring

At present the EPA and the local authorities carry out the bulk of water quality monitoring in Ireland. Many local authorities already have well established monitoring programmes in place. The EPA carries out physico-chemical monitoring of rivers on behalf of certain local authorities. However, most local authorities have suggested developing and/ or reviewing their existing catchment monitoring programmes, primarily for phosphorus. Many of these local authorities have indicated that they will integrate or have already integrated their monitoring programmes with that of the EPA in order to maximise use of available resources. Twenty-four local authorities have increased or propose to increase their monitoring for rivers, fourteen for lakes and three for groundwaters. Many local authorities have taken account of the sampling requirements in the Regulations when revising their monitoring programmes. New river monitoring stations have been proposed by a number of local authorities and liaison with the EPA is ongoing. Cork County Council conducted a review of the EPA monitoring data with the regional EPA biologist.

Monitoring of MRP has increased substantially at river stations in the country. Nationally 21 per cent of stations were monitored for MRP in the 2001-2002 period compared to 10 per cent of stations in the 1998-2000 period. Local authorities that have greatly increased their monitoring for MRP include: Cavan (from 37 per cent to 93 per cent of river stations), Cork County Council (from 0 per cent to 29 per cent), South Dublin (from 73 per cent to 93 per cent), Dun Laoghaire-Rathdown (from 0 per cent to 100 per cent), Kerry (from 17 per cent to 51 per cent), Kildare (from 6 per cent to 91 per cent), Limerick (from 4 per cent to 25 per cent), Louth (from 31 per cent to 70 per cent), Meath (from 1 per cent to 34 per cent), Roscommon (from 0 per cent to 18 per cent) and Westmeath (from 3 per cent to 38 per cent). There has been a substantial decline in MRP monitoring in Monaghan (from 42 per cent to 8 per cent).

Substantial lake monitoring programmes are also in place for chlorophyll *a* with updated data reported to the EPA from all the relevant local authorities except Longford, Roscommon, Offaly and Sligo (Appendix 1.3). Local authorities that reported considerable lake total phosphorus monitoring included Cavan, Clare, Cork County Council, Kerry and Westmeath. These monitoring programmes require considerable investment in equipment and manpower.

Twenty-seven local authorities aim to monitor phosphorus loads from point sources such as WWTPs or industry, with flow proportionate composite sampling being the recommended approach. These monitoring programmes should enable the local authorities to assess if discharges from the facilities in question are impacting on river/lake water quality and therefore to decide if phosphorus removal or stricter licensing limits is required. Monitoring of discharges from WWTPs is required under the Urban Waste Water Treatment Regulations, 2001 (S.I. No. 254 of 2001). Eleven local authorities propose to upgrade their hydrometric monitoring programme. An adequate hydrometric monitoring infrastructure is required where local authorities wish to establish phosphorus budgets for specific catchments and subcatchments. Six local authorities aim to establish phosphorus budgets for catchments in their functional area. Seventeen local authorities propose upgrading laboratory / monitoring equipment or quality assurance /

control procedures. Only four local authorities have proposed the establishment of a database of soil phosphorus levels in their county and one local authority (Cavan) proposes a full soil survey.

Twenty local authorities aim to carry out intensive hot-spot catchment studies to investigate the cause of chronic pollution of specific rivers/lakes within their functional area and to monitor and assess the impact of implementing specific measures. Experience in Fingal suggests that surveys for potential pollution sources are more effectively carried out in a systematic catchment wide basis. One problem encountered by the surveyors is that a high percentage of people are absent from their premises during normal working hours. Fingal is currently considering more flexible working arrangements to deal with this. Laois has adopted a programme of monitoring on a catchment, subcatchment and focus point (small area within subcatchment) basis to provide increasingly detailed information on water quality in a particular area.

Limerick County Council employed a hydrogeologist to define the zone of contribution to Lough Gur, which is fed predominantly from groundwater, and identify the potential pressures within this zone. The results of this investigation will be used as the basis for the measures programme. Limerick County Council is involved as a stakeholder in the catchment management projects for the Mulkear and Maigue Rivers. The Shannon Regional Fisheries Board manages these projects. The Maigue Project started in 1998 with detailed pollution investigations being carried out by fisheries staff in the Balliana and the Gloscha subcatchments of the Maigue. It was found that up to 87 per cent of farms in these areas had point source discharges. Through adopting a partnership approach and involving farming organisations, the fisheries board managed to achieve 100 per cent co-operation from the farmers involved. The point source discharges were stopped and remedial works undertaken. There has been some improvement in water quality in the Maigue, which is almost certainly due to the work of the fisheries board in this area. A similar project is also underway in the Mulkear catchment and again the Shannon Regional Fisheries Board is the lead agency and the local authority is one of the partners. Once again there is a strong emphasis on education and co-operation.

Kildare developed a subcatchment monitoring programme in the River Graney to determine reasons for water quality deterioration. This measure proved very beneficial as it highlighted hot spot areas within the subcatchment that were contributing the bulk of the phosphorus loading. Farm surveys commenced in these areas and the findings of these surveys verified that deterioration in the river water quality of the subcatchment was as a result of poor farming practices. All pollution incidents in Kildare are reported to the Environment Section and investigations are carried out to determine the source of the pollution. Serious incidents such as oil spills are dealt with immediately and essential equipment and materials are kept in stock at different locations throughout the country to deal with such events. An emergency telephone number is available to the public if an incident occurs after working hours or over a weekend period. Where necessary, a notice under the Water Pollution Act is served and in some cases prosecutions are taken for contravention of the Water Pollution Act.

South Tipperary has carried out a number of river channel surveys in priority rivers that have proven to be very successful, particularly in highlighting pollution hotspots. Limerick County Council has identified a number of commercial premises discharging polluting matter to waters. These have included hotels, nursing homes and public

houses. All of these have been served with Section 12 notices requiring them to cease the discharge and tanker all effluent to the nearest sewage treatment plant until adequate onsite provision is made for effluent treatment and disposal. Galway has participated in a pilot Environmental Information Management System and has instituted a register of complaints and follow up actions taken as a result.

4.2.2 Geographical Information Systems

Nineteen local authorities propose the establishment and use of Geographical Information Systems (GIS) for storage and analysis of water quality and other relevant data, to aid water quality management. The Local Government Computer Services Board (LGCSB) is currently introducing the *Catchment Envisage* package to local authorities. This package comprises a series of Access databases linked to a MapInfo GIS that will store, manage and maintain data for catchment management purposes. The package can be used to integrate, manage, analyse and present data on pressures/risk characteristics and monitoring data. *Catchment Envisage* was used by all participants in the Lough Derg / Ree project, as well as the Three Rivers Project. A number of local authorities have reported problems with the *Catchment Envisage* software, and this issue is being addressed by the LGCSB. New LabInfo and Farm Survey modules have been developed, which are more user-friendly and these are being installed in various local authorities. In addition, special measures are being taken to guide and co-ordinate the establishment of data management systems in the context of river basin management. The EPA, LGCSB and DEHLG have overseen the development of guidelines for GIS through a study carried out by Compass Informatics. The EPA and LGCSB are now co-ordinating the implementation of GIS based on these guidelines.

Cork County Council is progressing a programme to map onto MapInfo and field-verify the locations of industries, WWTPs, their discharge and storm overflow points. Cork County Council is also mapping over 2,000 farms visited from 1996-2001. GPS units are used by a number of local authorities when carrying out farm surveys and recording sampling points (e.g., Cork County Council, Laois, North Tipperary).

Monaghan employed consultants (Fehily, Timoney & Associates) to develop a GIS for the county, to improve capabilities for interrogation of water quality data and the production of trend analysis. The objectives of the GIS mapping project were to:

- identify the factors affecting surface water quality;
- develop a computer model to identify areas within the county with varying potential to contribute to surface water pollution;
- produce a GIS based map integrating all factors and identifying hot spots of potential pollution risk in Monaghan; and
- review existing practices for the monitoring and management of water quality in Monaghan.

This project has recently been completed and staff in the Environment Section are now reviewing project products and examining the associated *Envisage* Package with a view to use in the current work programme.

Kildare has developed a catchment based GIS incorporating all existing Section 4 and 16 licences in the Barrow, Boyne and Liffey catchments. However, Kildare has reported that setting up a GIS has proved difficult, as a lot of work was required to organise raster

maps and suitable hardware and software to operate the system. In addition, all staff that will operate the system will need the necessary training. Kildare has appointed a GIS co-ordinator to oversee the implementation of a GIS for all sections of the organisation. An individual will be appointed within each section to supervise the operation of the GIS within that section. South Tipperary has recruited a GIS technician to ensure the accurate updating of information and to provide training and support. Wexford has also appointed a GIS officer.

4.3 Consultative and Co-operative Measures

The EPA considers that the setting up of consultative and co-operative structures that involve all stakeholders is essential to the successful management of a catchment. This is particularly important where diffuse inputs are primarily responsible for deterioration in water quality. A range of actions across all sectors may be necessary to reduce diffuse losses and it is therefore important to include all stakeholders in catchment management initiatives. Stakeholders can be viewed as those who either contribute to the water quality problem, and therefore need to be involved as part of the solution, or those that are beneficiaries of improvements in water quality, as well as statutory bodies with responsibilities for the protection and improvement of water quality.

It is important that local authorities have liaison with other local authorities upstream or downstream of them as, for example, industries, treatment works or agricultural activities in one local authority functional area may be affecting water quality in another. The best practice approach to dealing with water quality issues is at a catchment based level.

Twenty-five local authorities are involved in multi-sectoral catchment management groups to tackle water quality problems in their areas and almost all local authorities have established liaison with other interested parties such as the EPA, Teagasc, industry, fisheries, farming and forestry organisations, general public etc. A number of local authorities (e.g., Donegal, Fingal) have acknowledged the high level of co-operation received from relevant parties (such as Teagasc, IFA) and consultative measures are viewed to be very worthwhile. The Lough Derg / Lough Ree, Three Rivers and Lough Leane WQMMS Projects all facilitated liaison between local authorities and other stakeholders. For example, under the Three Rivers Project consultative structures were set up with farming bodies, angling groups and public bodies who were represented at Operational Management Group meetings held at quarterly intervals during the course of the project. Prior to the adoption and implementation of the agricultural bye-laws extensive public consultation by the relevant local authorities took place. A number of local authorities are engaging in consultation with forestry organisations such as Coillte Teoranta before aerial fertilisation takes place (e.g., Cavan, Donegal).

All local authorities are or will be involved to some degree in the RBM Projects established under the Water Framework Directive. These Projects should facilitate co-operation between local authorities and all relevant stakeholders. The overall implementation of the Water Framework Directive will involve a high degree of co-ordination and partnership between public authorities in conjunction with extensive public consultation in order to tackle the challenge of water protection. Public seminars were held on the implementation of the Water Framework Directive in 2002 and a relevant website has been subsequently constructed (www.wfdireland.ie). Public

participation is a major element of the WFD, and should increase the quality of decision making and sense of ownership of the issues involved.

4.4 Public Education and Advisory Measures

Twenty-four local authorities propose public education campaigns, which may include activities such as the production of environmental newsletters, leaflets on water pollution, publications in local newspapers and schools education programmes. For example, in Cork there is the Green Bus travelling roadshow that travels 3-4 days a week to schools to give informational talks and distribute publicity booklets on nitrates and slurry management. There are also many schools around the country involved in the Green Schools Programme, a nationwide initiative promoting environmental awareness in schools. An Taisce award Green Flags to schools of particular merit.

Many local authorities have made presentations to their Strategic Policy Committees (SPC) on the Phosphorus Regulations. The SPCs are made up of elected members and representatives of multi-sectoral organisations. Most local authorities have websites which detail work being undertaken in the water quality protection area. Limerick, in partnership with County Limerick VEC, is developing AQUANET, a web-based project which aims to raise awareness of the importance of rivers as a natural resource. It is part funded under Centuri 21, which is a European Union project to develop the electronic delivery of local authority services. As part of the AQUANET project, an environmental education website is being established. This site will hold water quality information from a range of sources, including the council's own monitoring data. In addition, local community groups, including anglers, farmers, schools, active retirement groups, walkers etc., are being provided with IT training and field training on monitoring rivers and streams. The results of their assessments will be entered on the AQUANET website and regularly updated by the groups themselves. Training of community groups began in Kilfinane in April 2002 and has been very successful. Training is given on water quality and general nature conservation issues. The project has attracted a wide range of interest groups and has proved extremely popular.

An important part of the Three Rivers, Lough Derg/Ree and Lough Leane Projects was the undertaking of a programme of public consultation and awareness. This involved public education campaigns, provision of technical advice and assistance, publicity campaigns using television, radio, newspapers and other media and the promotion of these projects through public signs, information leaflets and preliminary, interim and final reports. A number of community and voluntary groups are supported through co-funding partnerships such as the Environment Partnership Fund offered by the DEHLG and local authorities. For example, the Offaly and Kildare Waterways, is a body set up to educate the public on the importance of waterways protection.

Twenty-three local authorities propose the establishment of a sectoral education programme, primarily for the agricultural sector. A number of local authorities state that they are actively promoting best farm management practices and the Code of Good Agricultural Practice (DAFF and DoE, 1996), particularly whilst conducting farm surveys. The Department of Agriculture has recently issued a Code of Good Farming Practice to which all farmers in receipt of EU aid under CAP or under the Structural Funds must adhere (DAFRD, 2001). In the future, agri-environmental payments will only apply to measures over and above 'good farming practice', as required by recent EU

Regulations. A number of local authorities have stated that they will notify the Department of farmers that have been prosecuted for offences that would constitute a breach of good farming practice (e.g., Fingal).

Kildare plans to advertise an annual Environmental Notice to farmers and agricultural contractors in all local newspapers circulating in the Barrow, Boyne and Liffey catchments. This notice will appear in these newspapers around the end of April each year and will advise farmers that due care must be taken with regard to the storage and control of silage effluent, especially at that time of the year. It will state that every effort must be made to prevent farmyard effluent and soiled water discharging to any watercourse. It will also outline that care must be taken when spraying herbicides, pesticides, fungicides etc., as agrochemicals are harmful to groundwater and surface water and the disposal of empty agrochemical containers should be carried out in an environmentally friendly manner.

The local authorities that have introduced bye-laws have produced and distributed booklets and other public education material explaining the legislation (e.g., Cork has circulated over 6,000 information booklets to farmers, farming bodies and other interested parties). There was also significant press coverage in both newspapers and radio at local and national level. Nineteen local authorities state that they have appointed or propose to appoint an environmental education officer or public awareness officer. Many local authorities are involved with Teagasc in conducting educational talks to farmers on REPS, good farmyard management of slurries and wastewater and the benefits of nutrient management planning. Laois has found that a greater number of people are reached if lectures are given at one of the farming association meetings rather than lecturing solely on a local authority basis. Local authorities involved in misconnections surveys are informing the public and businesses of the importance of separation of foul and surface waters.

Five local authorities specifically state that they are encouraging the use of phosphorus free detergents. For example, Dublin City encourages all discharge licence applicants to use phosphorus free detergents where possible. Conditions controlling phosphate discharges were included where phosphate based detergents were in use. The implementation of this measure has been considerably assisted by the voluntary agreement between the Government and the Irish Detergents and Allied Products Association to effectively provide for the phasing-out of phosphate based domestic laundry detergent products by the end of 2002. It is expected that this will result in a significant reduction in the phosphorus loading to watercourses from all WWTPs and septic tanks. Dublin City has at least partly attributed substantial reductions in phosphorus levels at their monitoring stations to the implementation of this measure. A comparison of MRP concentrations in Ringsend influent sewage between the 1998-99 and the 2001-02 periods indicates a reduction in the MRP concentration from 4.6 mg/l P to 2.9 mg/l P in the catchment. Limerick has specified the use of phosphate free detergents in discharge licence conditions, where appropriate.

4.5 Other Agri-environmental and Miscellaneous Measures

4.5.1 Agri-environmental

Sixteen local authorities propose to actively promote the Rural Environment Protection Scheme (REPS) and/or other pollution control grant schemes in their functional areas. Through the implementation of nutrient management planning requirements, REPS constitutes one of the primary methods for tackling water quality problems arising from agricultural sources. However, the effect of REPS is likely to be limited in intensive farming areas where water quality is generally under greatest pressure, due to the limited uptake of REPS by these farmers. An evaluation of REPS has found that REPS farms continue to support similar stocking rates using significantly less fertilisers compared with their extensive non-REPS counterparts (Regan, 2002). The findings of the Lough Derg and Lough Ree Catchment Monitoring and Management Project suggest a significant relationship between the implementation of REPS measures and river water quality improvement in the catchment. 63 per cent of measured river water quality improvements across the catchment as a whole occurred in areas of high REPS uptake and these areas account for only 27.8 per cent of the overall catchment area. However more extensive monitoring and evaluation of the water quality benefits of REPS is required (Clenaghan and Crowe, 2000; KMM, 2001).

The introduction of the agricultural bye-laws and their current implementation should encourage the participation of farmers in REPS. This is essentially for economic reasons because farmers will benefit financially from joining the REPS scheme and will be exempt from the bye-laws and the subsequent expense of adhering to these bye-laws, for as long as they are participating in REPS.

The Farm Waste Management and the Dairy Hygiene Schemes should enable farmers to avail of grant aid to improve farm infrastructure - deficits in which are widespread throughout the country. Funding under these schemes is often of critical importance to farmers to enable them to put in place the infrastructure that will reduce the likelihood of pollution, and meet environmental requirements, e.g., of agricultural bye-laws. Such investment can potentially make a significant contribution towards reducing animal manure run-off into water bodies, provided that the improvements in infrastructure are complemented by proper management of final disposal. Clare has noted that, in general, the uptake of farm pollution control grants and involvement in the REPS scheme has resulted in a positive impact on pollution control and management of facilities.

Tax allowances are available to farmers who have nutrient management plans and incur necessary capital expenditure for pollution control facilities. The relief covers waste storage facilities (water, slurry and effluent tanks) and winter housing for cattle and sheep. The relief is due to expire on 31 December 2003 (DAFRD, 2002).

4.5.2 Bioengineering

Local authorities may wish to consider the use of bioengineering solutions for improving the biological status of rivers where phosphorus control proves difficult, for example due to extremely low dilution of effluents. Such solutions may include provision of bank-side shading to prevent algal growths, raking of gravels, installation of aeration weirs or even artificial aeration during critical low-flow periods (Lucey *et al.*, 1999).

4.5.3 Research

Section 29 of the Water Pollution Act 1977, as amended, gives powers to the local authority to contribute to the funds of a person engaged in research, surveys or investigations in relation to water pollution. Eight local authorities are supporting or propose to support research into water quality or agricultural waste management issues.

Kildare is making a contribution of €9,525 / year over a three-year period towards limnological sampling in the Ryewater River system carried out by University College Dublin. This is a sub-catchment study with a particular focus on salmonids and has provided scientific data on salmonids to the Three Rivers Project. Cavan has appointed a project co-ordinator to lead a project on alternative technologies to deal with agricultural waste. It is expected that this project will involve consultation with those producers of agricultural waste and those dealing with the waste. Carlow has engaged consultants to carry out a number of studies including a study of nitrate levels in the River Barrow catchment and a study of the water quality of the Barrow in the environs of Carlow Town.

4.5.4 Staffing

Twenty-two local authorities have appointed or propose to appoint additional staff for implementation of the Regulations. A number of local authorities have set up or propose to set up staff teams dedicated solely or primarily to carrying out measures designed to achieve the targets of the Regulations e.g., in Cork County Council, Limerick County Council and Monaghan. Many local authorities have stated that restructuring under the Better Local Government initiative has improved their staff resources for tackling water quality issues. Almost all local authorities have stated that additional financial support from central government is required to successfully implement their programme of measures.

4.6 EPA Audits of Local Authorities

The Agency is required *inter alia* under the EPA Act, 1992 to assess whether local authorities are performing their statutory environmental protection functions. The Agency carried out audits in 2002 on a number of local authorities to assess local authority performance with regard to their statutory duties pertaining to the Phosphorus Regulations.

The audit criteria were based on: the relevant legislation; the Department of the Environment and Local Government policy against eutrophication (DoE, 1997); EPA Guidance documents on the preparation and submission of local authority measures and implementation reports (EPA, 1999a, 2000a); National Reports on the Regulations (Clenaghan *et al.*, 2000, 2001); and the local authority measures and implementation reports.

The audits consisted of a desk-based meeting between the EPA audit team and local authority staff (i.e., senior officers and staff involved in implementation of the Regulations). There was examination of evidence / documentation regarding measures implementation. Audit observations were documented and presented to local authority staff to ensure they were understood. Following the meeting there was the formal issue of a final audit report.

The main findings of the audits included:

- not all local authorities had submitted implementation reports as required by the Regulations;
- all relevant water quality monitoring stations should be reported on;
- monitoring, if undertaken, should comply with the sampling regime specified in the Regulations;
- in certain local authorities there was over-reliance on the Water Quality Monitoring and Management Projects with limited evidence of measures taken outside the area of these projects;
- the GIS / Catchment Envisage system is being delivered to local authorities, though some reported difficulties with its use;
- there was evidence of consultation with relevant bodies and regular team meetings;
- some progress was evident in measures to address sewage and industrial discharges;
- improvements were noted downstream of upgraded WWTPs (particularly those with nutrient removal installed);
- there was limited evidence of implementation of measures to tackle agricultural pressures (although there have been significant improvements, particularly in relation to farm surveys, since these audits were conducted).

It is intended that the audit process will identify successes in implementation of the Regulations, useful measures and methods of implementation and problems that local authorities have encountered. The audit process should also provide a method of information exchange between local authorities and the Agency and an additional mechanism for regular review of progress made towards meeting the targets of the Regulations. Therefore it is intended that the auditing process will be expanded to include more local authorities in the future.

5. Issues Raised

The EPA Guidance Note advised local authorities to identify problems encountered by them in implementation of the Regulations in their Implementation Reports. The main issues identified through implementation of the Regulations include:

- Shortage of staff and finance to implement measures - many of the measures proposed by the local authorities, as necessary to tackle water quality issues in their functional area, are resource intensive, such as farm surveys, monitoring, reviewing planning applications, and reviewing and enforcing discharge licences.
- Considerable difficulty in recruitment and retention of staff, loss of key staff and extensive internal movement and changes of staff through the process of Better Local Government (BLG). However, many local authorities also stated that BLG has improved the resources available to them to implement the Regulations.
- The foot and mouth crisis of 2001 resulted in a diversion of resources within local authorities and a reduction in monitoring and survey work as a disease control measure.
- Where bye-laws have been introduced it has taken farmers a certain amount of time to fully understand, appreciate and respond to the bye-laws.
- Enforcement of nutrient management plans has been problematic.
- Some local authorities have reported difficulties with computer software introduced to facilitate water quality management. The LGCSB is redeveloping the farms module section of Catchment Envisage following requests to do so by the local authorities. Tools to aid catchment management, such as GIS, are at an early stage of development in many local authorities.
- It is felt there is a need to co-ordinate the efforts of a number of organisations (e.g. farm bodies, Duchas, Teagasc, DEHLG, DAFRD, EPA, Fisheries Boards and County Councils) to promote implementation of Phosphorus Regulations. Structures set up under the Water Framework Directive should assist in this regard.
- Implementation of the Nitrates Directive may have an influence on local authority water quality management policy, in particular on the implementation of the bye-laws.
- Increased co-operation required between EPA and local authorities, particularly in the provision of information on IPC facilities and location of spreadlands.
- Lack of co-operation from a number of landowners when conducting farm surveys or compensation requested by some landowners when seeking permission to use their land for access to hydrometric stations.

- The implementation of misconnection surveys can be problematic given that many householders are absent during the day. This requires repeat visits or the introduction of flexible working arrangements for local authority staff.
- Sometimes there is a significant time lag (of 2-5 years) between farm visits, issuing of letters, development of Teagasc farm plan, availability of grants and implementation of works, which may have implications for achieving compliance at some stations.
- Investigative work is required in many areas to identify those inputs that are having the greatest impact on water quality in order to prioritise measures.
- Change in Q values may be due to habitat destruction such as drainage and construction and not driven by eutrophication factors.
- River biological monitoring on a national scale takes place on a three year cycle. This means that there will be two more complete biological monitoring periods before 2007 (i.e. 2001-2003 and 2004-2006). Within the timescale of the Regulations, this may limit the biological information available to local authorities in gauging whether or not measures implemented are successful. Many local authorities are also tracking changes in water quality through monitoring of phosphorus.
- Specific pollution problems stated by local authorities include:
 - lack of wastewater collection system infrastructure within built-up areas,
 - inefficient phosphate removal at certain WWTPs,
 - lack of nutrient removal at many inland WWTPs,
 - an acute deficit in slurry storage capacity,
 - organic and chemical fertiliser being spread on over-enriched land or under unsuitable weather and soil conditions,
 - significant impacts from forestry,
 - overgrazing by sheep,
 - the reluctance of people to desludge septic tanks,
 - failure of percolation areas to perform satisfactorily,
 - low compliance with SR6 / EPA on site treatment system guidelines,
 - unprecedented development due to economic boom.
- It is difficult at this early stage to assess the relative merit of particular measures. Many measures are at an early stage of implementation and, in any case, it is likely that there would be some time lag before the effects of the measures implemented would be apparent from water quality monitoring results.

6. Conclusions

- The information requested by the EPA for inclusion in the Implementation Reports was generally submitted.
- The Implementation Reports prepared under the Regulations are serving to bring together data and information on a range of water quality issues in a positive and co-ordinated manner.
- The process of compiling reports under the Regulations is serving to highlight those waters under pressure from eutrophication and waters in need of protection due to their current high quality, on a local authority basis.
- Updated water quality information was available in this report from approximately 42 per cent of river stations since the last reporting period. Biological information was updated at 27 per cent of stations and MRP information updated at 21 per cent of stations. The current national situation was compared with that pertaining at the time of the last National Implementation Report (Clenaghan *et al.*, 2001) and with the baseline data (which is largely from biological monitoring carried out in the 1995-97 period).
- Current monitoring indicates that 61.8 per cent of river stations nationally are currently compliant with the Regulations, based on 1998-2002 biological and MRP surveys. This represents an increase of 1.1 per cent in compliance from the previous reporting period. However, much of this increase in compliance was due to increased MRP monitoring.
- A total of 56.8 per cent of river stations nationally currently meet the biological targets in the Regulations. This represents a decline of 1.4 per cent in the percentage of stations meeting the biological targets of the Regulations from the previous reporting period. Despite the decline in biological water quality since the last reporting period, there are still a greater percentage of stations currently of satisfactory status than there were in the baseline survey (60.9 per cent as compared to 59.6 per cent).
- Local authorities with a relatively high level of compliance (>70 per cent of river stations compliant) with the Regulations are Dublin City, Kerry, Sligo, Cavan, South Dublin and Mayo. Local authorities with a relatively low level of compliance with the Regulations (< 50 per cent of river stations compliant) are Monaghan, Meath, Fingal, Dun Laoghaire-Rathdown, Longford and Kilkenny.
- There has been a continuing decline in the number and percentage of river stations of highest water quality, i.e., Q5 and Q4-5 stations. The EPA has noted significant impacts in the upper reaches of many rivers due to, for example, overgrazing, drainage activities and commercial forestry impacts (McGarrigle *et al.*, 2002).
- Marked increases in compliance between reporting periods are apparent in Dublin City, Dun Laoghaire-Rathdown, Cavan, Kildare, Westmeath, Fingal and Louth. These increases are largely due to increased monitoring for MRP and in some cases

(most notably Dublin City) reductions in MRP levels. However, only Fingal exhibits a notable increase in the percentage of stations meeting the biological targets of the Regulations.

- A marked decline in compliance with the Regulations was apparent in Monaghan, but this was largely due to a reduction in MRP monitoring from the previous reporting period. Kilkenny, Carlow, Clare and Wicklow all recorded moderate declines in the number of stations meeting the biological targets of the Regulations.
- It is clear from EPA and local authority river monitoring results that apparent water quality at certain individual stations may vary considerably depending on whether biological or phosphorus data is used. This is not unexpected as even though a high correlation has been demonstrated between the biological Q rating and MRP levels (e.g., Bowman *et al.*, 1996; Lucey *et al.*, 1999), for a variety of reasons this relationship may not be apparent at every individual station. It is important to note that the standards set in the Phosphorus Regulations are interim targets only. The Water Framework Directive requires that good water status must be achieved in rivers and lakes through meeting chemical, hydromorphological *and* biological targets by 2015. Therefore, biological quality provides a more reliable guide to future compliance with the requirements of the Water Framework Directive than phosphorus values.
- There are now 321 lakes with targets set under the Regulations. Current monitoring information is available on 238 of these lakes. This indicates that 152 of them are compliant with the Regulations. Counties with a relatively large number of non-compliant lakes (>4) include Cavan, Clare, Cork, Donegal, Galway, Leitrim and Monaghan. The EPA has identified mismanagement of animal manures as the reason for pollution in many lakes, particularly in counties Cavan and Monaghan (McGarrigle *et al.*, 2002).
- Local authorities are increasingly becoming involved in the RBM projects set up to facilitate implementation of the WFD. Local authorities will play a lead role in managing these projects which should provide local authorities with a huge amount of information that they can use to focus their resources. The setting up of multi-sectoral river basin management groups arising from the RBM projects should provide a vehicle for addressing water quality issues.
- The ongoing development of a GIS-based approach to water quality management in local authorities will provide useful additional information in pinpointing ‘hot-spot’ areas from which much of the pollution is arising. The RBM projects aim to deliver a GIS system and databases to local authorities, which should enable local authorities to deploy resources more effectively. This should help local authorities achieve the aims of the Regulations (as well as those of the WFD). However there are considerable shortcomings in many national datasets (e.g., those identified by MCOS, 2002) which need to be developed to enable effective management of water resources.
- Despite the foot and mouth crisis in 2001, there have been a substantial number of farm surveys undertaken by a number of local authorities. This is a welcome

development, as farm surveys appear to be having a positive impact on tackling potential pollution sources from agriculture.

- Most local authorities have chosen not to utilise various powers available to them under the Water Pollution Acts, such as mandatory nutrient management planning or introduction of agricultural bye-laws. This is of some concern, as recent research indicates that Irish farmers continue to apply a phosphorus surplus of somewhere between 11 and 15 kg/ha/year on farmed land. This surplus is contributing to the eutrophication of surface waters. It is unsustainable for the environment and costly to the farmer.
- Many local authorities report increases in the number of staff available to implement the Regulations, with the Better Local Government process contributing positively in this regard. Some local authorities have established dedicated teams which will be of particular benefit in implementing measures to address diffuse sources of pollution, such as that potentially coming from agriculture or forestry.
- An increased number of local authorities have proposed or are implementing measures to inform the general public and relevant sectors of water quality related issues and, in particular, eutrophication. The local authorities which have introduced agricultural bye-laws have gone through extensive public and sectoral consultation processes and most local authorities have employed environmental awareness officers.
- Notable improvements in water quality have been achieved through the installation of phosphorus removal at a number of wastewater treatment plants. However, problems remain in many rivers as a result of ineffective wastewater treatment. In addition, it is apparent from local authority surveys that single house treatment systems are often not installed appropriately or well maintained.
- The current development of a formal environmental management systems approach to local authority environmental management activities is welcomed and should facilitate more effective implementation of measures to protect and improve water quality. It is envisaged that further audits will be carried out by the EPA on local authorities to examine implementation of measures under the Regulations.

7. Recommendations

- It is essential for successful implementation of the Regulations that adequate resources are available to local authorities and the EPA to implement those measures considered necessary for water quality protection.
- The increased collection of phosphorus and biological water quality data should provide a clearer picture of the quality of our rivers and lakes and of the effectiveness of measures implemented by the local authorities to protect them. However, it is important to stress that the principal emphasis of work carried out under the Regulations should be on implementation of measures to improve/protect water quality, rather than on monitoring.
- Specific measures being implemented should be subjected to periodic auditing and review by local authorities to assess the relative success of measures chosen by them for meeting the targets. This will provide local authorities with important information to review and fine tune the various measures being implemented by them under the Regulations.
- Some local authorities have suggested focussing measures on unsatisfactory river reaches. Given that the analysis in this report indicates that high quality stations are still declining at a significant rate, it is important that local authorities also focus on measures to maintain water quality where it is of high quality. Most local authorities have not identified the reason for the decline in high quality waters in their functional areas. This should be investigated as a matter of urgency and measures put in place to address this issue.
- Local authorities should also attempt to identify the reason for non-compliance at other stations so that appropriate measures can be adopted. In many cases, the EPA biological survey reports provide information on suspected sources of pollution, which should be of use to local authorities (e.g., Clabby *et al.*, 2002). Information gathered from the RBM projects should also be of assistance. Dedicated teams within local authorities, set up to identify and address potential agricultural sources of pollution, have proved beneficial.
- In attempting to protect and improve the quality of surface waters it is important that local authorities do not overlook the protection of groundwaters. Current monitoring indicates that phosphorus levels in some groundwaters are elevated and these may contribute to surface water eutrophication.
- It is clear from work conducted in the Shannon System and elsewhere that local authority licensed industries are not being properly regulated (e.g., KMM, 2001). This is a serious problem that cannot be allowed to continue. Many local authorities have made some progress in reviewing discharge licences, and issuing new licences, in the light of the Regulations. However, greater effort is needed to tackle unlicensed discharges and, crucially, in monitoring and enforcing licences.
- Planning decisions can often have significant implications for water quality. It is recommended that all local authorities adopt a more integrated approach to planning /

environmental matters. An effective referral system between Planning and Environment Sections is required. Water quality protection and improvement should influence future County Development Plans. This would facilitate a more integrated environmental approach to be taken to industrial, housing and agricultural development at a local authority level. The Planning and Development Act, 2001, and the forthcoming implementation of the Strategic Environmental Assessment Directive (CEC, 2001) in Ireland should ensure that environmental concerns are addressed in the development of significant plans and programmes.

- Greater use of EPA Guidelines on the installation and management of single house wastewater treatment systems is strongly encouraged. Development Plans should include measures to improve operational capacity of single house wastewater treatment systems. In addition, adequate provision for urban wastewater treatment and appropriate monitoring and management of plants is required to allow for the full benefit of the large expenditure on wastewater treatment in recent years to be realised.
- EPA reports have consistently identified agricultural activity as one of the primary threats to water quality in Ireland. However, a number of tools available to local authorities to regulate agricultural activities are not being widely applied e.g., nutrient management planning, agricultural bye-laws. Some local authorities are awaiting the implications of the Nitrates Directive, however it is important that in the meantime considerable effort is undertaken to address pollution from this source. The application of nutrient management planning in intensively monitored catchments in the Shannon catchment has succeeded in dramatically reducing nutrient surpluses (KMM, 2001). The Three Rivers Project recommend the implementation of Best Farm Management Plans which incorporate both nutrient management plans and yard recommendations. It is recommended that these plans be linked to grant schemes and audited regularly to assess their effectiveness (MCOS, 2002). In those counties which have implemented bye-laws it is recommended that local authorities inspect at least 10 per cent of farms per year to confirm compliance (KMM, 2001).
- There is evidence to suggest that farmer participation in REPS may be having a beneficial impact on water quality. Local authorities should encourage REPS participation and make farmers aware of other pollution control grant schemes where possible.
- In relation to GIS, it has been documented that work is ongoing by the LGCSB to make the Catchment Envisage package more user-friendly. However, it should be noted that there are also significant shortcomings in many national datasets (e.g., those identified by MCOS, 2002), which need to be addressed to enable effective management of water resources.
- The cornerstone of European and national policy to tackle eutrophication is the adoption of a catchment based approach to water quality management. The establishment of RBM projects, set up to facilitate implementation of the WFD, should provide an opportunity for more effective and efficient use of resources at an inter-county level, to facilitate co-operation between local authorities, with other statutory bodies and with the relevant sectors and general public.

- The Regulations focus responsibility on individual local authorities to achieve water quality targets. Therefore, local authorities will need to ensure that co-ordinating structures to address water quality issues within the local authority and with the general public and relevant sectors at a local level are also maintained. In this regard it is worth noting that ineffective wastewater treatment or lack of enforcement of discharge licences, weakens the local authority case when presenting educational programmes or seeking co-operation from other sectors to tackle water quality issues.
- Many dedicated individuals and groups have built up local programmes promoting water quality protection on voluntary effort and minimal grants. Local authorities should integrate with and support these projects while promoting a county-wide message.
- It is important to note that, while the RBM projects will be of major benefit to local authorities, local authorities are already responsible for implementing many of the basic and supplementary measures listed under the WFD. Therefore, the success of the WFD, the RBM projects, and indeed the Phosphorus Regulations, will largely depend on implementation of these measures by local authorities.
- In conducting educational programmes or farm surveys, local authorities should emphasise that individual actions such as malfunctioning septic tanks or spreading slurry in a high risk manner all contribute to the overall decline in water quality. The general public and farmers may relate better to water quality issues when the cumulative effects of pollution are discussed with reference to a river or lake in their locality. Involving local organisations, such as the IFA, in farm survey programmes has proved beneficial in this regard.

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Appendix 1 Additional Water Quality Data

Appendix 1.1 Information on number and percentage of stations sampled for biology (Q), phosphorus (MRP) or both in the 1998-2002 period.
(*Correcting for river stations bordering two local authority areas).

Local Authority	Baseline number of stations	Current no. of stations sampled for Q /MRP in 1998-2002	Current no. of stations sampled for Q in 1998-2001	No. of new stations added in 2001	No. of stations sampled for Q in 2001	Percentage of current Q/MRP stations sampled for Q in 2001	No. of stations sampled for MRP in 2001/02	Percentage of current Q/MRP stations sampled for MRP in 2001/02	No. of stations sampled for Q/MRP in 2001/02	Percentage of current Q/MRP stations sampled for Q/MRP in 2001/02
Carlow	67	65	65	0	26	40	13	20	34	52
Cavan	110	110	108	0	61	55	102	93	106	96
Clare	175	166	165	1	87	52	26	16	93	56
Cork	385	383	383	0	5	1	111	29	116	30
Donegal	263	255	255	4	97	38	0	0	97	38
Dublin City	7	7	7	0	0	0	7	100	7	100
Dublin South	15	15	15	0	0	0	14	93	14	93
Dun Laoghaire Rathdown	9	9	9	0	0	0	9	100	9	100
Fingal	18	18	18	0	14	78	17	94	18	100
Galway	246	231	231	0	2	1	5	2	7	3
Kerry	210	206	203	2	103	50	105	51	154	75
Kildare	89	88	87	0	0	0	80	91	80	91
Kilkenny	99	98	96	0	65	66	12	12	69	70
Laois	108	103	103	1	50	49	19	18	62	60
Leitrim	90	87	87	0	21	24	6	7	21	24
Limerick	131	127	127	0	17	13	32	25	45	35
Longford	39	37	37	0	5	14	0	0	5	14
Louth	44	43	41	0	0	0	30	70	30	70
Mayo	257	246	246	4	103	42	11	4	104	42
Meath	101	99	97	0	15	15	34	34	49	49
Monaghan	76	72	72	2	46	64	6	8	46	64
Offaly	110	107	107	0	0	0	5	5	5	5
Roscommon	128	124	123	0	0	0	22	18	22	18
Sligo	103	99	99	2	27	27	2	2	27	27
North Tipperary	113	110	110	0	4	4	10	9	12	11
South Tipperary	118	115	115	0	6	5	20	17	26	23
Waterford	76	74	74	0	26	35	5	7	31	42
Westmeath	72	65	65	0	0	0	25	38	25	38
Wexford	114	111	110	0	77	69	3	3	78	70
Wicklow	117	112	112	0	29	26	2	2	31	28
Preliminary Total	3490	3382	3367	16	886	27	733	21	1423	42
Revised Total*	3355	3253	3238	16	864	27	680	21	1355	42

Appendix 1.2 Baseline number of local authority river stations in each biological quality rating (corresponding to current stations monitored in Table 7). (*River stations Q4, Q4-5 or Q5; **Correcting for river stations bordering two local authority areas).

Either MRP Target (µg P/l) Or Q-value Target Baseline Status	15 Must retain quality Q5	20 Q4-5	30 improve Q4	30 Improve to Q4 Q3-4	50 Improve to at least Q3-4 Q3	70 Improve quality to at least Q3 Q2-3	70 Q≤2	Total	% Satisfactory (biology)*
Carlow	1	12	19	18	14	1	0	65	49.2
Cavan	7	25	28	24	20	4	0	108	55.6
Clare	15	29	71	19	22	8	1	165	69.7
Cork	6	121	169	59	24	3	1	383	77.3
Donegal	31	95	70	21	20	5	13	255	76.9
Dublin City	0	0	0	0	3	1	3	7	0
Dublin South	0	4	5	0	3	2	1	15	60.0
Dun Laoghaire Rathdown	1	0	2	1	4	0	1	9	33.3
Fingal	0	0	0	2	11	3	2	18	0
Galway	13	39	84	36	43	12	4	231	58.9
Kerry	12	70	73	28	16	1	3	203	76.4
Kildare	0	1	16	34	24	6	6	87	19.5
Kilkenny	2	3	34	31	23	1	2	96	40.6
Laois	3	13	34	30	18	2	3	103	48.5
Leitrim	9	29	32	10	5	2	0	87	80.5
Limerick	6	12	39	28	31	7	4	127	44.9
Longford	1	2	11	13	8	0	2	37	37.8
Louth	0	7	11	9	13	1	0	41	43.9
Mayo	14	70	97	28	28	5	4	246	73.6
Meath	0	0	20	37	30	4	6	97	20.6
Monaghan	1	11	9	11	32	5	3	72	29.2
Offaly	4	8	34	31	21	5	4	107	43.0
Roscommon	0	12	56	16	27	9	3	123	55.3
Sligo	3	39	34	11	10	1	1	99	76.8
North Tipperary	5	9	28	35	29	3	1	110	38.2
South Tipperary	2	14	54	19	22	3	1	115	60.9
Waterford	2	25	29	10	7	1	0	74	75.7
Westmeath	0	4	13	31	12	1	4	65	26.2
Wexford	0	11	34	31	28	4	2	110	40.9
Wicklow	16	34	34	11	14	0	3	112	75.0
Preliminary Total	154	699	1140	634	562	100	78	3367	
Revised Total**	149	686	1096	599	539	95	74	3238	
% of Revised Total	4.6	21.2	33.8	18.5	16.6	2.9	2.3		59.6

Appendix 1.3 Current water quality information for lakes reported on by the EPA or local authorities in 1998-2002 period.

(O = Oligotrophic; M = Mesotrophic; E = Eutrophic; H = Hypertrophic) (*The baseline status of these Monaghan lakes needs to be confirmed).

EPA Lake No.	Lake Name	Local Authority Responsible	Baseline Trophic Status	1998-2000 Trophic Status	2001/02 Trophic Status	Standard to be Achieved Trophic Status	1998-2000 Total P (ug/l P)	2001/02 Total P (ug/l P)	Standard to be Achieved Total P (ug/l P)	Has Either Standard Been Achieved?	Compliance Target Date
183	Gowna (North)	Cavan, Longford	E	H	H	M	41	65	20	No	2007
183	Gowna (South)	Cavan, Longford	E	E	H	M	34	65	20	No	2007
204	Kinale	Cavan, Longford	O	E	M	O	28	24	10	No	2007
214	Lavey	Cavan	E	E	E	M			20	No	2010
238	Mullagh	Cavan	E	H	E	M	48	45	20	No	2007
241	Nadreegeel	Cavan	M	E	H	M	47	55	20	No	2007
264	Oughter (Eonish)	Cavan	H	H	H	E	58	72	50	No	2007
264	Oughter (Chalets)	Cavan	H	H	H	E	62	72	50	No	2007
269	Ramor	Cavan	H	E	H	E	77	60	50	No	2007
281	Sheelin	Cavan, Meath, Westmeath	E	E	E	M	19	24	20	No	2007
285	Sillan	Cavan	H	E	E	E	72	48	50	Yes	2007
3	Acrow East	Clare	M	M	M	M			20	Yes	2010
4	Acrow West	Clare	M	M	M	M			20	Yes	2010
30	Atedaun	Clare	M	M	M	M			20	Yes	2010
46	Ballyallia	Clare	M	M	M	M			20	Yes	2010
47	Ballybeg	Clare	E	H	H	M		79	20	No	2007
48	Ballyear	Clare	M	M	M	M			20	Yes	2010
49	Ballycullinan	Clare	E	M	M	M		30.1	20	Yes	2007
51	Ballylean	Clare	M	M	M	M			20	Yes	2010
	Ballyquirka	Clare	M			M			20		2007
	Bunny	Clare	O		O	O			10	Yes	2007
73	Burke	Clare	E	E	E	M			20	No	2010
85	Castle	Clare	E	E	E	M		29.5	20	No	2010
90	Cloonmackan	Clare	M	M	M	M			20	Yes	2010
91	Cloonsnaghta	Clare	M	M	M	M			20	Yes	2010
112	Cullaun	Clare	O	M	M	O			10	No	2007
113	Cullaunyeeda	Clare	M	M	M	M		22.9	20	Yes	2010
131	Doo Lough	Clare	M	M	M	M		22.3	20	Yes	2007
135	Dromore	Clare	E	E	E	M		19.9	20	Yes	2007
138	Drumcullaun	Clare	O	O	O	O			10	Yes	2010
182	Gortglass	Clare	E	E	E	M		23.9	20	No	2007
184	Graney	Clare	M	M	M	M		19	20	Yes	2007

EPA Lake No.	Lake Name	Local Authority Responsible	Baseline Trophic Status	1988-2000 Trophic Status	2001/02 Trophic Status	Standard to be Achieved Trophic Status	1988-2000 Total P (ug/l P)	2001/02 Total P (ug/l P)	Standard to be Achieved Total P (ug/l P)	Has Either Standard Been Achieved?	Compliance Target Date
194	Inchiquin	Clare	M	M	M	M		19.7	20	Yes	2007
198	Keagh	Clare	M	M	M	M		40.2	20	Yes	2010
211	Knockerry	Clare	M	M	O	M			20	Yes	2010
217	Lickeen	Clare	E	M	E	M		21.5	20	No	2007
256	Naminna	Clare	O	O	O	O			10	Yes	2010
1	Abisdealy	Cork	E	M	M	M		31	20	Yes	2007
5	Aderry	Cork	E	E	M	M		56	20	Yes	2010
29	Atarrif	Cork	M	M	M	M		49.5	20	Yes	2010
42	Avaul	Cork	E	E	M	M		18	20	Yes	2010
45	Ballin	Cork	E	E	H	M		47	20	No	2007
66	Bofinna	Cork	M	O	M	M		14.9	20	Yes	2007
81	Carrigadrohid Reservoir	Cork	M	M	M	M		24.6	20	Yes	2010
86	Castlemehigan	Cork	M	M	M	M		25	20	Yes	2010
92	Cluir	Cork	E	E	E	M		51.5	20	No	2010
97	Coolkelure	Cork	H	H	E	E		52	50	Yes	2010
116	Curraghlichy	Cork	M	M	M	M		27	20	Yes	2010
117	Curramore	Cork	M	M	M	M		15.6	20	Yes	2010
129	Derryvegal	Cork	M	M	O	M		21	20	Yes	2010
134	Druminidy	Cork	E	E	E	M		108	20	No	2010
137	Drumbrow	Cork	M	M	M	M		18	20	Yes	2010
153	Fadda	Cork	E	E	O	M		19	20	Yes	2010
169	Glen	Cork	M	M	O	M		29	20	Yes	2010
172	Glenbeg	Cork	M	M	O	M		21	20	Yes	2010
195	Inniscarra Reservoir	Cork	E	M	E	M		26.9	20	No	2007
252	Nambrackderg	Cork	O	O	O	O		12	10	Yes	2010
284	Shreelane	Cork	E	E	E	M		26	20	No	2010
287	Skeagh	Cork	E	E	E	M		26	20	No	2010
292	Tooreen	Cork	E	E	M	M		24	20	Yes	2010
	Lough	Cork City	M		H	M		47.5	20	No	2007
9	Agher	Donegal	O	O		O			10		2010
12	Akibbon	Donegal	O	O		O	20		10	Yes	2007
15	Anillanowennamarve	Donegal	O	O		O			10		2010
16	Anna	Donegal	O	O	O	O			10	Yes	2010
21	An Iuir (Anure)	Donegal	O	O	M	O			10	No	2010
27	Ardpatten	Donegal	O	O		O			10		2010

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58	Barra	Donegal	O	O		O	10		10	Yes	2007
93	Columbkille (Ballyshannon)	Donegal	O	O	O	O			10	Yes	2010
94	Columbkille (Milford)	Donegal	O	O	M	O			10	No	2010
107	Crathai (Craghy)	Donegal	O	O	O	O			10	Yes	2010
110	Croagh	Donegal	O	O		O			10		2010
115	Cullionbuoy	Donegal	O	O		O			10		2010
122	Derg	Donegal	O	O		O			10		2010
132	Doo	Donegal	O	O		O			10		2010
142	Dunglow	Donegal	O	O	O	O			10	Yes	2010
143	Dunlewy	Donegal	O	O		O	10		10	Yes	2007
144	Ea	Donegal	O	O	O	O			10	Yes	2010
150	Eske	Donegal	O	O	O	O			10	Yes	2010
151	Fad (East)	Donegal	O	O	O	O			10	Yes	2010
152	Fad (West)	Donegal	O	O	M	O			10	No	2010
160	Fern	Donegal	M	M	O	M			20	Yes	2010
166	Gartan	Donegal	O	O	O	O	10		10	Yes	2007
170	Glen	Donegal	O	O	O	O			10	Yes	2010
171	Glen (Ballintra)	Donegal	O	O	O	O			10	Yes	2010
174	Glencoagh	Donegal	O	O		O			10		2010
180	Goland	Donegal	O	O		O			10		2010
181	Gorman	Donegal	O	O		O			10		2010
199	Keel (Goldrum)	Donegal	O	O		O			10		2010
200	Keel (Rosses)	Donegal	O	O		O			10		2010
205	Kindrum	Donegal	O	O	M	O			10	No	2010
206	Kinny	Donegal	O	O	M	O			10	No	2010
218	Loughaderry	Donegal	O	O		O			10		2010
225	Meenlecnalore	Donegal	O	O	O	O			10	Yes	2010
233	Mourne	Donegal	O	O	O	O			10	Yes	2010
240	Nacung	Donegal	O	O		O	<10		10	Yes	2007
247	Naglea	Donegal	O	O		O			10		2010
254	Nambradden	Donegal	O	O	O	O			10	Yes	2010
255	Naminn	Donegal	O	O	O	O			10	Yes	2010
260	New	Donegal	O	O	M	O			10	No	2010
268	Port	Donegal	O	O	M	O			10	No	2010
272	Reelan	Donegal	O	O		O			10		2010

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276	Salt	Donegal	O	O		O			10		2010
277	St Peters	Donegal	O	O		O			10		2010
278	Sessiagh	Donegal	M	M	O	M			20	Yes	2010
280	Shannagh	Donegal	M	M	O	M			20	Yes	2010
298	Unshin	Donegal	O	O	O	O			10	Yes	2010
302	Veagh	Donegal	O	O	O	O	<10		10	Yes	2007
7	Adoorau	Galway	O	O		O			10		2010
	Adrehid	Galway	O			O			10		2007
8	An Ghadai (Agaddy)	Galway	O	O		O			10		2010
10	Agraffard	Galway	O	O		O			10		2010
11	Ahalia Nth (Scribe)	Galway	O	O	O	O			10	Yes	2007
14	Anillaun	Galway	O	O	E	O			10	No	2007
24	na hArd-doiriu (Ardderrou)	Galway	O	O		O			10		2010
25	Ardderry	Galway	O	O	O	O			10	Yes	2007
26	Oiriulach (Aroolagh)	Galway	O	O		O			10		2010
31	Atraí (Athry)	Galway	O	O	O	O			10	Yes	2007
32	Achadh Bhuailé (Aughawoolia)	Galway	O	O		O			10	Yes	2007
33	an Da Eala (Auneala)	Galway	O	O		O			10		2010
34	Aunfree	Galway	O	O	O	O			10	Yes	2007
35	Aunierin	Galway	O	O	E	O			10	No	2007
36	an Iolra Thoir (Aunilra East)	Galway	O	O		O			10		2010
37	an Iolra Thiar (Aunilra West)	Galway	O	O	O	O			10	Yes	2007
38	an Oir (Aunore)	Galway	O	O		O			10		2010
39	An Mhianaigh (Aunweeny)	Galway	O	O	O	O			10	Yes	2007
40	an Mhuilinn (Aunwillin)	Galway	M	O		M			20	Yes	2007
43	an Bhalia (Awalia)	Galway	O	O	O	O			10	Yes	2007
52	Ballynahinch	Galway	O	O	E	O			10	No	2007
53	Ballynahowan	Galway	O	O		O			10		2010
54	Bhaile na Cille (Ballynakill)	Galway	O	O	E	O			10	No	2007
60	Beaghcauneen	Galway	O	O		O			10		2010
65	Bofin	Galway	O	O	O	O			10	Yes	2007
67	Bhoth Loische (Boliska)	Galway	O	O		O			10		2010
69	Bovroughaun	Galway	O	O		O			10		2010
75	Cappahoosh	Galway	O	O	O	O			10	Yes	2007

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79	na gCaisleach (Carraroe)	Galway	O	O		O			10		2010
80	Carrafinla	Galway	M	M		M			20		2010
88	Cloonadoon	Galway	O	O		O			10		2010
89	Clongat	Galway	O	O		O			10		2010
99	Corrib (Upper)	Galway	M	M	M	M	8		20	Yes	2007
99	Corrib (Lower)	Galway	M	M	M	M	9		20	Yes	2007
118	Cutra	Galway	M	M	E	M			20	No	2007
124	Derryclare	Galway	O	O	O	O			10	Yes	2007
125	Derrycunlaghmore	Galway	O	O		O			10		2010
127	Derrylea	Galway	O	O	O	O			10	Yes	2007
128	Derryneen	Galway	M	M		M			20		2010
148	Enask	Galway	O	O		O			10		2010
154	Fada Ghleannain (Fadda)	Galway	O	O		O			10		2010
155	Fadda (Beaghcauneen)	Galway	O	O		O			10		2010
158	Fee	Galway	O	O		O			10		2010
178	Glean da Loch (Glendollagh)	Galway	O	O	O	O			10	Yes	2007
189	Uí Chadhain (Hawnagheekyne)	Galway	O	O		O			10	Yes	2007
190	Hoirbeaird (Hibbert)	Galway	O	O	O	O			10	Yes	2007
191	an Iarainn (Ierin)	Galway	O	O		O			10		2010
192	An ghainimh (Illauntrasna)	Galway	O	O		O			10	Yes	2007
193	Inagh	Galway	O	O		O			10		2010
196	Inbhear Beag (Inverbeg)	Galway	O	O		O			10		2010
197	Cheim na Cailli (Keamnacally)	Galway	O	O		O			10		2010
208	Chnoc an Locha (Knocka)	Galway	O	O		O			10		2010
210	Dhoire Bhanbh (Knockaunawaddy)	Galway	O	O		O			10	Yes	2007
212	Kylemore	Galway	O	O		O			10		2010
	Lettercraffroe	Galway	M			M			20		2007
	Lurgan	Galway	O			O			10		2007
222	Maumeen (Ballyconneely)	Galway	O	O		O			10		2010
223	Maumwee	Galway	O	O	O	O			10	Yes	2007
242	Nafeakle	Galway	O	O		O			10		2010
243	Nafuoey	Galway	O	O	O	O			10	Yes	2007

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244	Na Foirneise (Nafurnace)	Galway	O	O	O	O			10	Yes	2007
249	Nahasleam (West)	Galway	O	O		O			10	Yes	2007
250	Nahasleam (East)	Galway	O	O	E	O			10	No	2007
253	an Bhric Mhoir (Nambrackmore)	Galway	M	O	O	M			20	Yes	2007
257	na mBruaichini (Namroughania)	Galway	O	O	O	O			10	Yes	2007
258	Na Sceiche (Naskeha)	Galway	M	O	O	M			10	Yes	2007
259	na Tamhnai Moire (Natawnymore)	Galway	O	M	M	O			10	No	2007
263	Oorid	Galway	O	O	O	O			10	Yes	2007
267	Pollacoppul	Galway	O	O		O			10		2010
270	Rea	Galway	O	O	E	O			10	No	2007
274	Ros an Mhil (Rossaveel)	Galway	M	M		M			20		2010
283	Shindilla	Galway	O	O	O	O			10	Yes	2007
286	na Scainimhe (Skannive)	Galway	O	O		O			10		2010
289	Slieveaneena	Galway	O	O		O			10		2010
293	Troscan (Truscan)	Galway	M	M		M			20		2010
294	Thulaigh na Leathair (Tullaghalaher)	Galway	O	O		O			10		2010
295	Tullaghanoon	Galway	O	O		O			10		2010
297	Chonga Mor (Uggamore)	Galway	O	O		O			10		2010
301	Barr an tSruthain (Vauratruffaun)	Galway	O	O		O			10	Yes	2007
77	Caragh	Kerry	O	O	O	O		11	10	Yes	2007
87	Cloonaghlin	Kerry	M	M		M			20		2010
	Gill (Kerry)	Kerry	M	M	E	M			20	No	2007
187	Guitane	Kerry	O	O	O	O	10	10	10	Yes	2007
215	Leane (Killarney)	Kerry	E	M	M	M	15	12	20	Yes	2007
215	Leane (Ross Bay)	Kerry	E	E		M	72		20	No	2007
236	Muckross	Kerry	O	O	O	O	8	10	10	Yes	2007
299	Upper Lake (Killarney)	Kerry	O	O	O	O		10	10	Yes	2010
2	Acres	Leitrim	E	E	E	M			20	No	2007
6	Adoon	Leitrim	M	M	M	M			20	Yes	2010
13	Allen	Leitrim, Roscommon	O	O	O	O			10	Yes	2007

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19	Annary	Leitrim	M	M	M	M			20	Yes	2010
70	Bran	Leitrim	M	M	M	M			20	Yes	2010
74	Calloughs	Leitrim	E	E	E	M			20	No	2010
82	Carrigport	Leitrim	M	M	M	M			20	Yes	2010
130	Donagher	Leitrim	M	M	M	M			20	Yes	2010
159	Fenagh	Leitrim	M	M	M	M			20	Yes	2010
163	Gangin	Leitrim	H	H	H	E			50	No	2010
165	Garadice	Leitrim	M	M	M	M	36		20	Yes	2007
173	Glencar	Leitrim, Sligo	O	O	O	O			10	Yes	2010
226	Melvin	Leitrim, Donegal, Fermanagh	O	M	M	O			10	No	2007
273	Rinn	Leitrim	E	E	E	M			20	No	2010
275	Rowan	Leitrim	O	O	O	O			10	Yes	2010
188	Gur	Limerick	E	E	E	M			20	No	2010
17	Annagh	Longford	M	M		M			20		2010
98	Corbeagh	Longford	H	H		E			50		2010
162	Forbes	Longford, Roscommon	M	M		M			20	Yes	2007
239	na Bach	Longford	E	E		M			20		2010
296	Tully	Longford, Leitrim	E	E		M			20		2010
78	Carra (South)	Mayo	M	M	M	M	11		20	Yes	2007
78	Carra (North)	Mayo	O	M	M	O	10		10	No	2007
84	Carrowmore	Mayo	M	M	M	M			20	Yes	2007
95	Conn (Upper)	Mayo	M	M	M	M	16		20	Yes	2007
95	Conn (Lower)	Mayo	M	M	M	M	11		20	Yes	2007
114	Cullin	Mayo	M	O	O	M			20	Yes	2007
133	Doo	Mayo	O	O	O	O			10	Yes	2007
	Feeagh	Mayo	O			O			10		2007
161	Fin	Mayo	O	O	O	O			10	Yes	2007
175	Glencullin	Mayo	O	O	O	O			10	Yes	2007
207	Knappaghbeg	Mayo	M	E	E	M			20	No	2007
221	Mask	Mayo, Galway	M	M	M	M	10		20	Yes	2007
	Moher	Mayo	O			O			10		2007
18	Annamakerrig	Monaghan	E	M	M	M	40		20	Yes	2007
20	Antrawar*	Monaghan	M	M	M	M			20	Yes	2010
22	Aphuca*	Monaghan	M	M		M			20		2010
23	Aportan*	Monaghan	M	M	M	M			20	Yes	2010

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41	Avaghon*	Monaghan	M	M	M	M			20	Yes	2010
44	Ballagh*	Monaghan	M	M	H	M			20	No	2010
57	Baraghy*	Monaghan, Cavan	M	M	E	M			20	No	2010
59	Bawn*	Monaghan	M	M	M	M			20	Yes	2010
62	Blackraw*	Monaghan	M	M	M	M			20	Yes	2010
68	Bougagh*	Monaghan	M	M	E	M			20	No	2010
76	Carnaroe Reservoir*	Monaghan	M	M		M			20		2010
100	Corcaghan*	Monaghan	M	M	H	M			20	No	2010
101	Corconnolly*	Monaghan	E	E	H	M			20	No	2010
102	Corkeeran*	Monaghan	E	E	H	M			20	No	2010
108	Creedy*	Monaghan	M	M	E	M			20	No	2010
109	Crinkill*	Monaghan	M	M	E	M			20	No	2010
126	Derrygooney*	Monaghan	M	M	E	M			20	No	2010
136	Drum*	Monaghan	M	M	H	M			20	No	2010
139	Drumgole*	Monaghan	M	M	E	M			20	No	2010
141	Drumsaul*	Monaghan	O	O	E	O			10	No	2010
146	Eigish	Monaghan	H	E	H	E			50	No	2007
147	Emy*	Monaghan	E	E	M	M			20	Yes	2010
156	Fea*	Monaghan	M	M	E	M			20	No	2010
157	Feagh*	Monaghan	M	M	E	M			20	No	2010
168	Glaslough*	Monaghan	M	M	M	M			20	Yes	2010
185	Greagh*	Monaghan	M	M	E	M			20	No	2010
186	Grove*	Monaghan	O	O	H	O			10	No	2010
202	Kilcorran*	Monaghan	O	O	E	O			10	No	2010
213	Lambes*	Monaghan	M	M	M	M			20	Yes	2010
219	Maherney	Monaghan	H	H	H	E			50	No	2010
220	Major*	Monaghan	O	O	E	O			10	No	2010
224	Meenish*	Monaghan	M	M	E	M			20	No	2010
227	Minor*	Monaghan	M	M	H	M			20	No	2010
229	Monalty*	Monaghan	M	M	H	M			20	No	2010
230	More*	Monaghan	O	O	M	O			10	No	2010
231	Morne*	Monaghan	M	M	E	M			20	No	2010
234	Muckno	Monaghan	M	M	E	M			20	No	2007
235	Muckno Mill*	Monaghan	M	M	E	M			20	No	2010
237	Mulanary*	Monaghan	O	O	E	O			10	No	2010

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245	Nagamaman*	Monaghan	O	O	E	O			10	No	2010
246	Naglack*	Monaghan	O	O		O			10		2010
251	Namachree*	Monaghan	M	M	H	M			20	No	2010
262	Oony*	Monaghan	M	M	H	M			20	No	2010
288	Skerrig Reservoir*	Monaghan	O	O	H	O			10	No	2010
290	Spring Lake*	Monaghan	O	O	M	O			10	No	2010
291	Toghan*	Monaghan	E	E	H	M			20	No	2010
303	White	Monaghan	H	H	E	E	83		50	Yes	2007
266	Pallas	Offaly	O	O		O			10		2010
63	Boderg	Roscommon, Longford	M	M		M			20	Yes	2007
64	Bofin (Shannon)	Roscommon, Longford	M	M		M			20	Yes	2007
140	Drumharlow	Roscommon	M	M		M			20	Yes	2007
164	Gara	Roscommon	M	M		M			20	Yes	2007
201	Key	Roscommon	M	M		M			20	Yes	2007
261	Oakport	Roscommon	M	M		M			20	Yes	2007
28	Arrow	Sligo	M	M	M	M	20		20	Yes	2007
145	Easky	Sligo	O	O	O	O			10	Yes	2007
167	Gill	Sligo	O	O		O			10	Yes	2007
	Talt	Sligo	O			O			10		2007
121	Derg	North Tipperary, Clare, Galway	E	M		M	32		20	Yes	2007
55	Ballyscanlan	Waterford	M	M	M	M			20	Yes	2010
56	Ballyshunnock	Waterford	E	E	E	M			20	No	2010
61	Belle	Waterford	M	M	M	M			20	Yes	2010
83	Carrigavantry	Waterford	E	E	E	M			20	No	2010
103	Coumalocha	Waterford	O	O		O			10		2010
104	Coumduala	Waterford	O	O		O			10		2010
105	Coumfea	Waterford	O	O		O			10		2010
106	Coumshingaun	Waterford	O	O		O			10		2010
111	Crotty's	Waterford	O	O		O			10		2010
120	Deelish	Waterford	O	O		O			10		2010
209	Knockaderry	Waterford	H	H	M	E			50	Yes	2010
228	Mohra	Waterford	O	O		O			10		2010
279	Sgilloge	Waterford	O	O		O			10		2010
50	Ballykeeran	Westmeath	M	M	M	M	20	20	20	Yes	2007
96	Coosan	Westmeath	M	M	M	M	10	13	20	Yes	2007

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123	Derravaragh	Westmeath	M	M	M	M		15	20	Yes	2007
149	Ennell	Westmeath	M	M	M	M		16	20	Yes	2007
179	Glore	Westmeath	M	M		M			20		2010
203	Killinure	Westmeath	M	M	M	M	12	10	20	Yes	2007
216	Lene	Westmeath	M	O	M	M		11.6	20	Yes	2007
232	Mount Dalton	Westmeath	O	O		O			10		2010
265	Owel	Westmeath	M	M	O	M		9	20	Yes	2007
271	Ree	Westmeath, Longford, Roscommon	E	M	M	M	34	13	20	Yes	2007
282	Sheever	Westmeath	M	M		M			20		2010
71	Bray (Upper)	Wicklow	O	O	O	O			10	Yes	2010
72	Bray (Lower)*	Wicklow	E	O	O	M			20	Yes	2007
119	Dan	Wicklow	O	O	O	O		21	10	Yes	2007
176	Glendalough Lake Lower	Wicklow	O	O	O	O			10	Yes	2010
177	Glendalough Lake Upper	Wicklow	O	O	O	O			10	Yes	2007
248	Nahanagan	Wicklow	O	O	O	O			10	Yes	2010
300	Vartry Reservoir	Wicklow	O	M	M	O			10	No	2007
304	Golden Falls Reservoir	Wicklow	E	E		M			20	No	2007
305	Pollaphouca Reservoir	Wicklow	M			M			20		2007

Appendix 2 EPA Implementation

Environmental Protection Agency

Under the EPA Act, 1992 and the Waste Management Act, 1996 a wide range of functions are allocated to the Agency which relate to the protection of water quality. These functions include the provision of support and advisory services for local authorities; the licensing, regulation and control of activities, primarily relating to industrial and waste management activities; monitoring of water quality and establishment of databases of same; and the promotion and co-ordination of research into water quality issues.

Support and Advisory Services

Phosphorus Regulations

The Agency hosted a seminar in May 1999 to facilitate preparation of local authority Measures Reports. As a follow up to the seminar, the Agency issued a Guidance Note to local authorities on preparation and submission of the Measures Reports (EPA, 1999a). The Agency hosted a second seminar in June 2000 to facilitate preparation of local authority Implementation Reports. At this seminar, the Agency issued a Guidance Note to Local Authorities on Preparation and Submission of the Implementation Reports (EPA, 2000a). The Agency also published a Synthesis Report of the Measures Reports (Clenaghan *et al.*, 2000). The Agency has subsequently held three more seminars on the Regulations in 2001, 2002 and 2003, which included workshops on particular aspects of measures implementation. The Agency published a National Report on Implementation of the Regulations in 2001 (Clenaghan *et al.*, 2001) and must do so every two years until 2009.

Other Support and Advisory Services

The Agency, in conjunction with the DEHLG, County and City Managers Association and the County and City Engineers Association, has developed a management system for identifying and assessing local authority performance of statutory environmental protection functions. This system has been piloted in three local authorities, and is currently being made available to all local authorities on an incremental basis in 2003 and 2004.

The Agency has recently published guidance and reports on a number of issues relevant to water quality protection including publications on the state of the environment (Stapleton *et al.*, 2000); national water quality (McGarrigle *et al.*, 2002); biological survey reports (e.g., Clabby *et al.*, 2002); urban wastewater (O'Leary *et al.*, 2000); water quality management planning (Fanning *et al.*, 1999); water quality objectives and standards (EPA, 1997); parameters of water quality (EPA, 2001b); a national phosphorus balance for agriculture (Brogan, *et al.*, 2001); dangerous substances (Stephens, 2001); groundwater (DELG, GSI & EPA, 1999; Keegan, 2003); and drinking water (Page *et al.*, 2002). The Agency has also published a series of BATNEEC notes on integrated pollution control (IPC) licensing of industry; a series of landfill manuals; regular reports on EPA licensing of industrial and waste facilities; and a series of wastewater treatment manuals.

Licensing and Control of Waste and Industrial Facilities

Waste Management

Pollution of ground and surface waters may arise from waste disposal and recovery activities. The Waste Management (Licensing) Regulations, 1997-2000, brought into force the system of waste licensing under the Waste Management Act. All local authorities and private companies that are engaged in significant waste disposal and recovery activities are required to apply for a licence from the EPA. By the end of 2001, the EPA had received 187 applications with 101 licences granted to date.

The EPA has produced a series of Landfill Manuals (1995-2001) which provide guidance on the selection, management, operation and termination of use of landfill sites. The licensing system administered by the EPA will ensure that all significant waste management activities are operated to the appropriate environmental standards, using an environmental management systems approach. Licensing of waste facilities is based on the application of an integrated approach, and the use of BATNEEC (Best Available Technology Not Entailing Excessive Costs) principles as required in the legislation, thus minimising potential impacts on all media, including surface and groundwaters. All waste licenses are issued and reviewed taking account of the phosphorus standards set in the Regulations. Licensees are required to operate an Environmental Management Systems approach, which should result in the minimisation of emissions.

Industry

Industrial activities may have a significant impact on surface and ground water quality. Under the EPA Act, 1992, the Agency is responsible for the licensing of large or complex activities with significant polluting potential on the basis of integrated pollution control and the use of BATNEEC. The Agency has published some 40 BATNEEC guidance notes, to facilitate applicants preparing license applications, and publishes annual reports on the environmental performance of industrial activities regulated by the Agency. All industrial licenses are issued and reviewed taking account of the phosphorus standards set in the Regulations. Licensees are required to operate an Environmental Management Systems approach, which should result in the minimisation of emissions. By the end of 2001 the EPA had received 629 applications with 522 licences granted to date.

The Agency reviews the environmental performance of all its licensees to ensure compliance on an ongoing basis, and takes appropriate enforcement action and/or reviews licences as required. In particular, the Agency closely reviews the performance of Integrated Pollution Control (IPC) facilities in managed catchments, having due regard to the Phosphorous Regulations 1998 and the recommendations of Catchment Monitoring & Management reports. The transposition of the IPPC Directive 96/61/EC into Irish law will mean that most IPC licences are likely to require review, having regard to Best Available Techniques (BAT). Changes include a greater emphasis on energy efficiency, residuals management and natural resource consumption reduction. Additional activities will be covered with some thresholds reduced, bringing the total anticipated number of activities to be covered to over 800 (EPA, 2003b).

The Agency has not found it necessary to specifically review any of the IPC licence discharges under the EPA (Licensing) Regulations 1994 in light of the Phosphorous Regulations. Discharge conditions pertaining to phosphorous emissions may, however, be revised in the course of reviews arising from other issues. IPC licensing of industry has resulted in significant environmental benefits for waters in terms of pollution and waste reduction, and rationalisation of water use. For example, substantial improvements have been noted in the Dalgan and Clare Rivers, Co. Galway, through the IPC licensing of a large meat processing plant operating in the Dalgan River catchment (Clabby *et al.*, 2001). Intensive agricultural enterprises involving pig and poultry production above a minimum threshold size are subject to IPC licensing. Ultimately, all new and existing industrial and manufacturing facilities in the State with a significant pollution generating capacity will be subject to IPC licensing.

Monitoring

At present water quality and quantity data in the State arise mainly from the monitoring programmes undertaken by the EPA, the local authorities and OPW, supplemented by the work of the fishery agencies in specific fishery waters.

Hydrometric Network

Flows in the river system are measured at some 1447 locations using either continuous level recorders (548 locations) or staff gauges (899). Of the 548 continuous recorders, the OPW operate approximately 300, which were originally intended to provide information for flood control and drainage, the ESB operate 36, primarily in relation to the operation of the hydroelectric stations and to dam safety, while the local authorities operate 188, to assist water pollution control measures. The local authorities operate the bulk of the 899 staff gauges. The EPA's eight regional teams of hydrometric technicians undertake the checking and updating of the water level/flow relationships at all of the local authority gauges and also carry out additional checks at the OPW gauges. Processing of water levels data to produce flow statistics is carried out by the EPA for the local authority gauges while the other bodies process their own data. The EPA maintains a register of all gauges and produces periodic reports on flow statistics. In addition to the foregoing, the Agency also records groundwater levels in some 350 boreholes on an ongoing basis and is incorporating similar data from earlier measurements made by the GSI into the resulting database.

River Water Quality

The EPA national river water quality biological monitoring programme covers 13,200 km of river channel. The EPA carries out the biological surveys at some 3,200 locations over a three year cycle. As part of the national programme on the physico-chemical monitoring of river water quality, the EPA take samples for chemical analysis at approximately 1,600 locations, covering approximately 5,100 km of river channel. Most of the measurements are designed to detect the effects of organic pollution (e.g., from sewage and farm wastes) and there is limited monitoring for potentially toxic substances.

Lake Water Quality

Nationally, 304 lakes were examined in the 1998-2000 period with information on these lakes derived mainly from investigations carried out by the EPA, local authorities and the Central and Regional Fisheries Boards. This represents a significant increase over previous reporting periods and is due, largely, to the commencement of the National Lake Monitoring Programme in 2000 (Bowman and Toner, 2001). This survey covers approximately 64 per cent of the total lake surface area with 24 of the 25 largest lakes/reservoirs monitored. Many of these are important fishery waters that are monitored by the Central and Regional Fisheries Boards. The Shannon lakes and representative acid-sensitive lakes are monitored by the EPA while several of the local authorities monitor lakes in their functional areas either directly or with the assistance of outside agencies. The measurements made are mainly intended to detect the presence of eutrophication.

Some 130 lakes in the Midlands, West and Northwest were surveyed in September 2001 to measure chlorophyll levels and map emergent vegetation patterns and catchment land use using an airborne spectrophotometer and video imagery. In addition, over 90 acid-sensitive lakes are monitored by the Agency.

Groundwater Quality

The EPA initiated a national monitoring programme for groundwaters in 1995, which currently includes some 200 representative locations, sampled twice a year. The measurements made include those that are of interest in assessing the suitability of the groundwaters as sources of domestic and industrial supply, e.g., faecal coliform bacteria and nitrates. Ortho-phosphate concentration is also monitored at most stations.

Tidal Water Quality

In relation to tidal waters, 25 estuaries are currently monitored annually by the EPA for general water quality conditions and, in particular, for signs of eutrophication. The Marine Institute operates a number of measurement programmes to assess the levels of potentially toxic contaminants in the marine environment, particularly in commercial species of fish and shellfish. Other monitoring programmes in tidal waters deal with the quality of bathing waters, which is undertaken by the local authorities, and the incidence of toxic algal blooms, operated by the Marine Institute.

Databases

Special measures are being taken to guide and co-ordinate the establishment of data management systems in the context of river basin management. The EPA, LGCSB and DEHLG have overseen the development of guidelines for GIS through a study carried out by Compass Informatics. The EPA and LGCSB are now co-ordinating the implementation of GIS nationally based on these guidelines.

Research

The Agency is responsible for developing, supporting, implementing and promoting a national programme of environmental research. Several research projects have been

supported which apply directly to water quality protection and management. These include projects on lake monitoring (O'Mongain *et al.*, 1999), ecological assessment of Irish lakes (Irvine *et al.*, 2001), eutrophication processes in the littoral zones of western Irish lakes (McCarthy *et al.*, 2001), eutrophication from agriculture (Jennings *et al.*, 2003; Daly and Casey, 2003), anaerobic digestion (Mahony *et al.*, 2002), phosphorus loss from soil to water (e.g., Tunney *et al.*, 2000), the zebra mussel (Lucy and Sullivan, 2001), and the Water Framework Directive (Irvine *et al.*, 2002).

The EPA is currently implementing the Environmental Research Technological Development and Innovation (ERTDI) programme, funded under the National Development Plan, which has been in operation since the beginning of 2000. Under this programme there are major research projects on water quality impacts from agriculture and forestry. The former project will investigate sources and pathways of nutrient losses, seasonal variation of phosphorus losses from soil and field management, and nitrate leaching from soils. This €3.4M project is co-ordinated by Teagasc and involves a consortium of scientists from various Irish universities and international experts. The forestry projects will focus on best practice for forestry plantation and management, particularly with regard to fertiliser application and minimising the threat from acidification. There are a number of research projects ongoing in relation to meeting needs arising from implementation of the Water Framework Directive. In addition, there is currently work ongoing to establish a national soils database.

Appendix 3 Local Authority Implementation

Appendix 3 - Explanatory Note.

In Appendix 3, a summary is presented of water quality status in each local authority area; of the progress made in measures being implemented; and of the additional measures proposed by each local authority. The trend in river water quality is discussed based on a comparison of Q values in the baseline data (Appendix 1.2) with current data (Table 7). The trend in river quality compliance with the Regulations is discussed based on the biological and phosphorus data available for the last national Implementation Report (i.e., 1998-2000 data) and the most current data available for this report (which consists of 1998-2001 biological data and 2001/2002 phosphorus data) (Table 6). Lake water quality is discussed based on information presented in the main report and Appendix 1.3. Maps are presented for each local authority on current compliance with the Phosphorus Regulations at the designated river and lake monitoring stations. It is possible that, for certain counties, not all river monitoring stations may be shown as work is ongoing within the Agency on GIS development and on verifying river station locations using Geographical Positioning Systems. Summary information is provided for each local authority on progress made in measures being implemented and on additional measures proposed. These summaries are based on information contained in the most recent local authority Implementation Reports.

Carlow County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in water quality with 60 per cent of stations currently of satisfactory quality compared to 49.2 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 60 per cent comply with the standards set in the Regulations, down 5.6 per cent from the last report.
- 56.9 per cent of stations meet the biological targets of the Regulations, down 8.7 per cent from the last report.
- There has been a serious decline in high quality Q4-5 stations, down from 12 in the baseline survey to 7 currently.
- However, there has been a reduction in the number of moderately polluted Q3 and Q2-3 stations from 15 in the baseline survey to 7 currently.

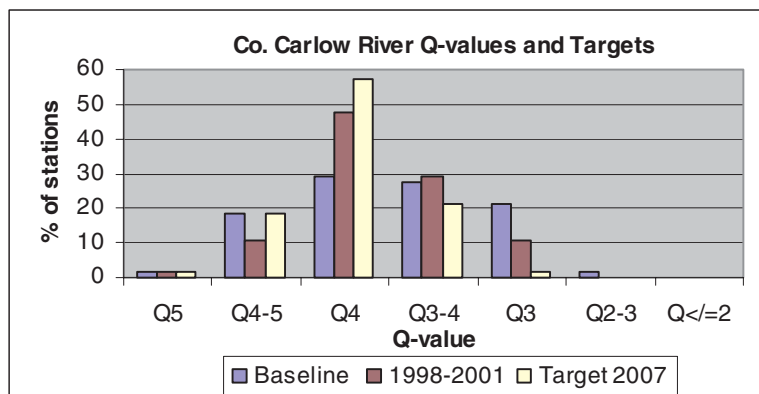
ADDITIONAL MEASURES PROPOSED

- Introduce agricultural bye-laws following completion of the South Eastern RBM Plan.
- Website under development providing environmental information on Barrow and Slaney catchments. Technical advice available in a number of relevant environmental areas.
- Existing Section 4 and 16 discharge licences will be reviewed in 2003.
- Identify developments that require a licence under Water Pollution Act.
- Improvements to WWTPs proposed, including tertiary treatment for Muinebheag and secondary treatment for Leighlinbridge.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Consultant has carried out a study of nitrate levels in Barrow catchment and identified areas requiring nutrient management planning.
- Consultant has carried out study of Barrow water quality in environs of Carlow Town.
- Liaison between Planning and Environment Sections.
- Council is lead authority for South Eastern River Basin Management Project.
- Mortarstown WWTP upgraded to tertiary treatment.
- Myshall WWTP performance being monitored.
- Council supervises septic tank percolation tests and inserts maintenance clause for all small-scale treatment systems in planning permissions.
- Enforcement of Water Pollution Act. Legal proceedings taken against one farmer under Section 3 of Act.
- Farm Survey carried out on all agricultural developments applying for planning permission.
- All intensive agricultural enterprises subject to Nutrient Management Planning. One nutrient management plan requested under Water Pollution Act.
- Environmental Awareness Officer employed in 2003.
- GIS technicians appointed and developing GIS (Catchment Envisage).
- Source protection plan for Muinebheag completed.

(a)



(b)

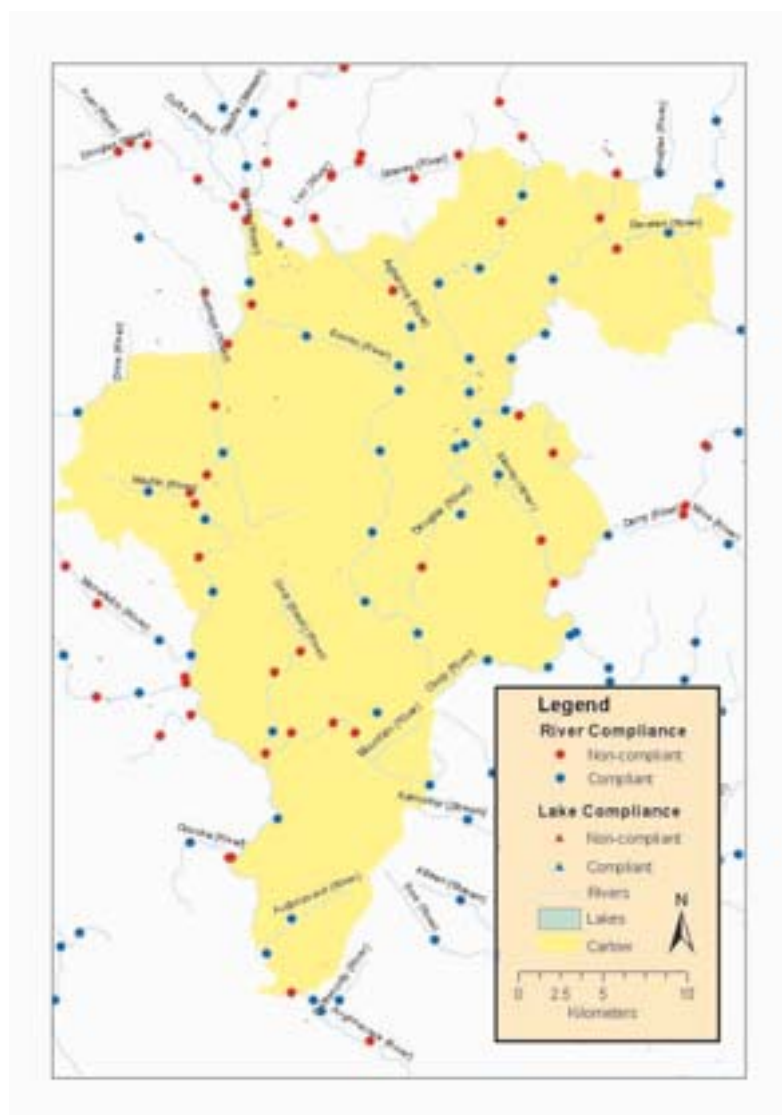


Figure 1(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in County Carlow.

Cavan County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality with 49.1 per cent of stations currently of satisfactory quality compared to 55.6 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 73.6 per cent comply with the standards set in the Regulations, up 19 per cent from the last report. However, this is largely due to increased MRP monitoring, rather than improvements in water quality.
- Only 38.9 per cent of stations meet the biological targets of the Regulations, down 3.6 per cent from the last report.
- There has been a serious decline in high quality Q5 and Q4-5 stations, down from 32 in the baseline survey to 23 currently.
- There has also been an increase in the number of seriously polluted stations from 0 in the baseline survey to 3 currently.
- Only one of 12 lakes currently monitored in the County complies with the Regulations (Lough Sillan).

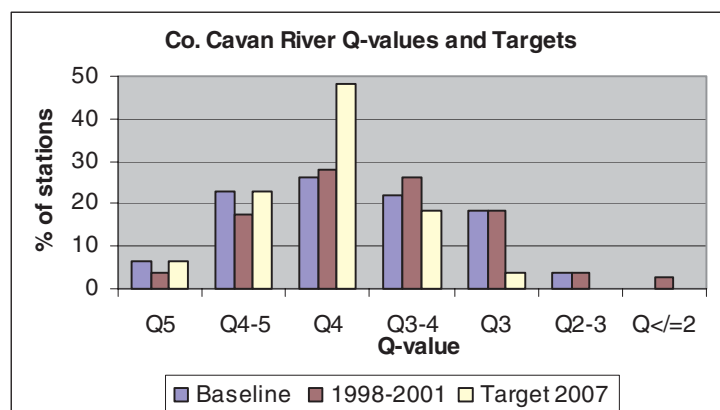
ADDITIONAL MEASURES PROPOSED

- Increased public information and education programme proposed.
- Upgrade wastewater collection throughout County.
- Refine agricultural non-point source model.
- Undertake soil survey of county and review soil testing procedures.
- New WWTP schemes planned for Belturbet (with P removal) and Mountnugent.
- Improvements planned for Oldcastle WWTP.
- Monitor effectiveness of source protection programmes for Skeagh and Acannon Loughs.
- Farm surveys to be undertaken in Loughs Oughter, Nadrageel and Sillan catchments and Cullies and Glyde River catchments.
- Extensive monitoring programme for industries with Section 4 discharge licences being developed.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Environmental awareness Officer appointed (2002).
- Seven additional staff appointed to Environment Section, though six of these on a temporary basis.
- River chemical monitoring programme reviewed and substantially expanded. All chemical monitoring of rivers undertaken by Council.
- Harmonisation of river monitoring with that of the EPA.
- All designated lakes monitored on a monthly basis following considerable investment in lake monitoring equipment (£50K) and manpower.
- Licence conditions for significant industries being reviewed (e.g. Carton Bros, Lakeland Dairies) and non-compliant discharges targeted. Monitoring of industries underway including Monery By-products, Baillie Foods, Virginia Milk Products, Abbots and Liffey Meats. Liaison with EPA where relevant.
- Planning controls introduced on type and number of septic tanks in sensitive areas, relevant bye-laws drafted.
- Agricultural bye-laws introduced in the Sheelin catchment on 1 Jan 2001, following extensive consultation. Bye-laws may be extended to other areas if successful.
- Publicity, public education and REPS promotion from bye-law introduction. Booklet produced explaining bye-laws.
- Staff employed to implement bye-laws.
- Ongoing promotion of good agricultural practice.
- P removal in place at Cavan, Cootehill, Virginia WWTPs, monitoring underway. Improvements noted downstream of upgraded Ballyjamesduff WWTP.
- Upgrades completed/underway of Bellanagh and Killashandra WWTPs.
- Collection and treatment facilities being provided at Redhills, Stradone, Mountnugent, Crosskeys, Kilcogy and Gowna.
- All WWTPs monitored according to UWWT Regulations, 1994. Monitoring underway of Mullagh, Kingscourt and Shercock WWTPs to determine if phosphorus removal required.
- 'Hot spot' area study for Lough Sillane, Lough Ramor, Lough Oughter, Rag River catchments initiated, including monitoring of feeder rivers and downstream of certain point sources.
- Involvement in Erne Sustainable Wetlands Project.
- Technicians recently employed to conduct farm surveys.
- Farm surveys undertaken upstream of Lough Gowna, in the Bunnoe catchment and in the Moynalty catchment.
- Liaison with Coillte Teo. regarding aerial fertilisation.
- Four Council landfills now licensed. Corranure has new lined cell and is the only operating landfill.
- Project co-ordinator appointed to lead project on alternative technologies to deal with agricultural waste.

(a)



(b)

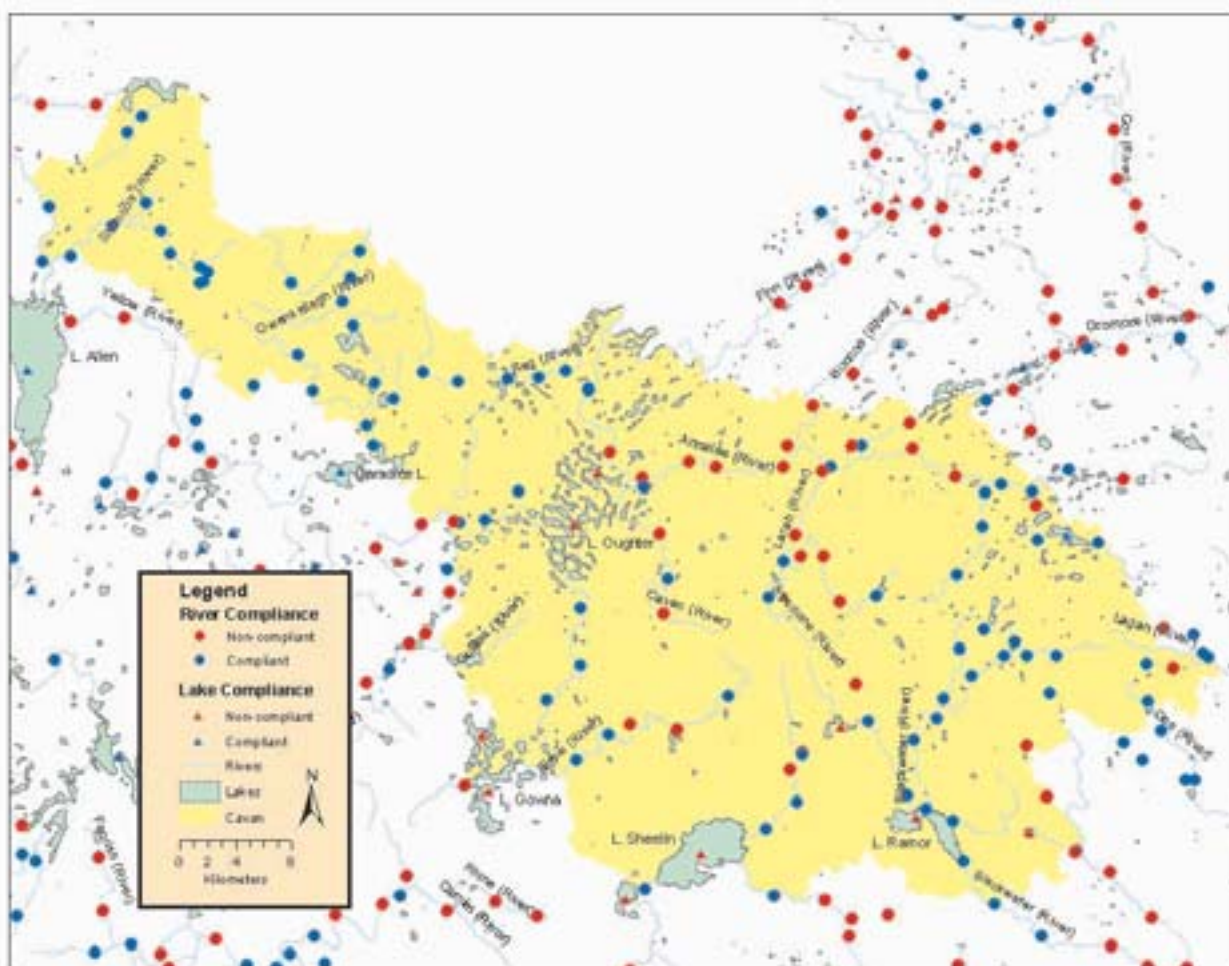


Figure 2(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Cavan.

Clare County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight decline in water quality in Clare with 69.1 per cent of stations currently of satisfactory quality compared to 69.7 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 63.3 per cent comply with the standards set in the Regulations, down 7.7 per cent from the last report.
- 60.6 per cent of stations meet the biological targets of the Regulations, down 7.7 per cent from the last report.
- There has been a decline in high quality Q5 and Q4-5 stations, down from 44 in the baseline survey to 34 currently.
- There are 27 lakes in the county that fall under the Regulations, 26 of these were recently monitored and 6 of these were not compliant (Loughs Ballybeg, Burke, Castle, Cullaun, Gortglass and Lickeen). One lake (Dromore) complies with the total phosphorus standard only. Lough Derg has improved in quality to mesotrophic status and complies with the Regulations. However, this improvement may be partly due to infestation of the lake with the zebra mussel, as well as to improvements in wastewater treatment.

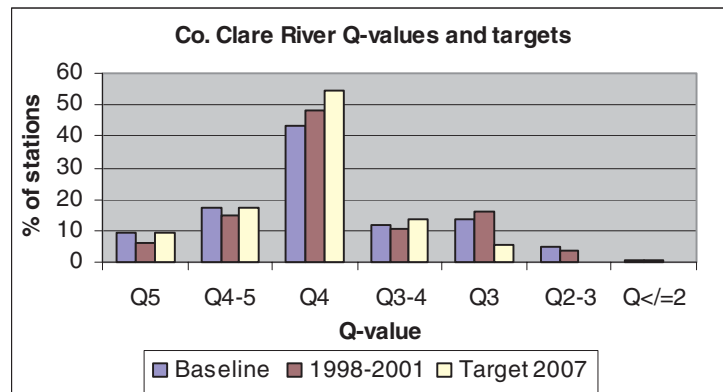
ADDITIONAL MEASURES PROPOSED

- The Shannon River Basin Management System and Western River Basin Management System incorporate 96% and 4% of county respectively. Kirk McClure and Morton have been selected as preferred consultants for the Shannon RBMS. These systems will provide detailed monitoring and management information to assist achievement of the objectives of the WFD.
- Section 16 licences for Ennis town area under preparation, once issued other town surveys will commence.
- New WWTPs to be provided for Quilty/ Mullagh, Doolin, Labasheeda, Kilkee, Crusheen and Limerick environs.
- WWTPs will be upgraded at Kilfenora, Shannon and Ballyvaughan.
- Phosphorus removal to be provided in WWTPs at Feakle, Broadford, Carrigaholt, Corraclare, Tulla, Ennis/Clarecastle, Scariff /Tuamgraney, Lisdoonvarna, and Corofin WWTPs.
- Upgrade of Ennis town collection system to reduce storm water discharges.
- Assess impact of forestry in Ballycullinan, Doo, Dromore, Gortglass, Lickeen, Castle and Doon Lake catchments.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Control discharges from septic tanks and small treatment plants through planning and Water Pollution Act licensing.
- Catchment studies have comprised extensive farm surveys in period from July 2000-2002 (over 240), with risk classification and subsequent issue of 58 Advisory letters and 54 Section 12 notices. Catchments studied include Doonaha, Moyarta and Wood River catchments and Gortglass and Castle lake catchments. More farm surveys proposed in other catchments.
- REPS and Best Farm Management Practice promotion ongoing.
- Ongoing monitoring of 30 WWTPs, 13 rivers and 26 groundwater sites by Co. Council and 80-100 lakes by Trinity College Dublin.
- Lisdoonvarna WWTP upgraded.
- WWTP constructed at Kilkishen.
- Treatment of discharges from Ballymacraven WWTP improved.
- Glendine River catchment surveyed for septic tank discharges.
- River and lake chemical monitoring programmes expanded.
- County Groundwater Protection Scheme being implemented.
- Lough Derg/Ree WQMMS completed April 2001. Management measures being implemented.
- Source protection plans prepared for Ballybeg and Killone lakes, and Ennis, Ballyvaughan and Whitegate water supply source areas. Recommendations regarding source protection zones in Drumcliffe Draft Source Protection Plan (Ennis water supply source) being implemented.
- Waste management plan adopted with Limerick and Kerry County Councils and Limerick City.
- Doora landfill closed in 2001 and central waste facility being constructed at Ballyduff Beg, Inagh to open August 2002.
- Council has a number of waste management initiatives including grants to clean up illegal dumping areas, farm plastic recycling initiatives and free collections of household hazardous waste.
- Draft sludge management plan prepared with Limerick County Council lead authority for region.
- Integration of planning and water quality ongoing.
- In period July 2000-2002, the Council has issued a total of 96 Section 12 Notices and nine Section 23 Notices. The Council has taken two prosecutions under Section 3, five under Section 4, five under Section 12 and three under Section 23.
- In period July 2000-2002, six new licences have been issued under Section 4 of the Water Pollution Act. There are 32 active licences now monitored by the Council.
- Two nutrient management planning notices have been prepared under the Water Pollution Act. Intensive farming activities (i.e. piggeries and poultry rearing facilities below IPC thresholds) will be required to prepare Nutrient Management Plans.
- Council engaged in multi-sectoral catchment management.
- Liaison with Coillte on aerial fertilisation.
- GIS being used for catchment management.
- Environmental Awareness Officer appointed May 2000.
- Environmental Technicians participate in REPS courses.
- Public awareness / education included in Lough Derg/Ree study.

(a)



(b)

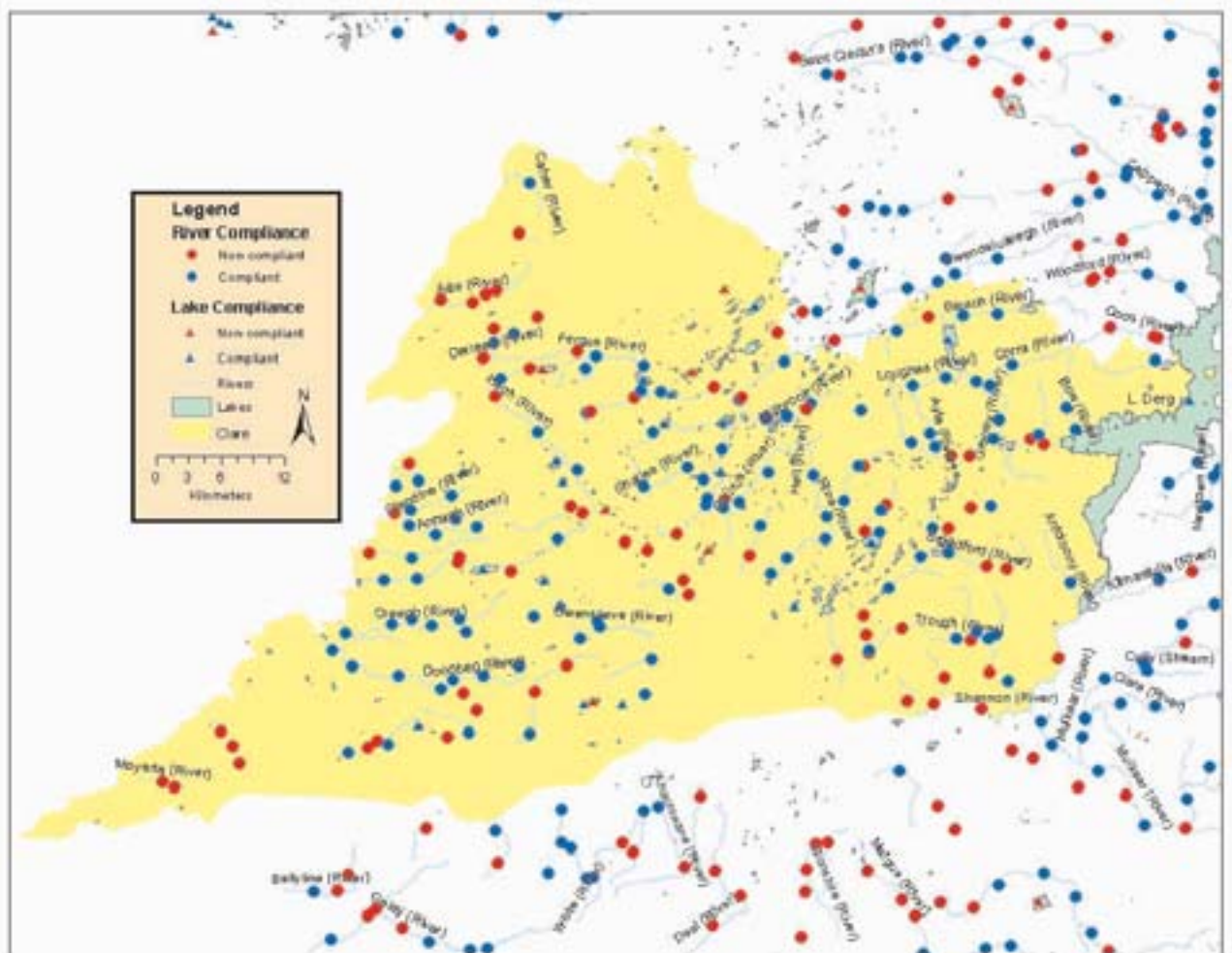


Figure 3(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Clare.

Cork County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality with 73.4 per cent of stations currently of satisfactory quality compared to 77.3 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 68.4 per cent comply with the standards set in the Regulations, up 5.2 per cent from the last report. This is largely due to increased MRP monitoring.
- 63.2 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- There has been a serious decline in high quality Q4-5 stations, down from 121 in the baseline survey to 86 currently, as well as a drop from 6 to 4 in the number of Q5 stations.
- Six of the 23 lakes currently monitored in the county do not comply with the Regulations (Ballin, Cluir, Drumidny, Iniscarra, Shreelane and Skeagh).

ADDITIONAL MEASURES PROPOSED

- All facilities which discharge to waters and sewage to be identified and policy/procedure put in place to phase in licensing where required.
- Section 12 and section 23 notice compliance surveys.
- Continue licensing and enforcement of Water Pollution Act with respect to non-IPC industries, review all licences greater than 10 years old.
- Examine and map sludge management practices and location of spreadlands of non-IPC industries, WWTPs and water treatment plants.
- Assess revised Catchment Envisage Farm, Labinfo modules and Laboratory Information System requirements.
- Seek funding to evaluate cost and requirements of effective integrated lab information system.
- Set up more formal consultative structure with Forest Service and Coillte.
- Council proposed as lead authority to progress South Western River Basin Management System Project.
- Environmental Education Officer proposed.
- Maximise function of newly established Environment Strategic Policy Committees and Corporate Policy Group to develop policies within Council to reduce eutrophication.
- More integrated environmental approach in future Cork County Development Plans.
- Upgrading/construct WWTPs.
- Review content, clarity and layout of warning letters issued to farmers following surveys.
- To improve communication with agricultural sector / public through information leaflets, newsletters and website.
- Article 3(9) time extension (to 2013) sought for achieving targets at 39 stations.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Priority Farm Survey programme ongoing.
- In period Jan 2000 – May 2002, 1967 farms visited, 926 warning letters sent, 118 Section 12s issued, 35 Section 23s issued, 18 Nutrient Management Plans requested and agreed, several prosecutions in progress.
- Enforcement of Agricultural Byelaws, regulating agricultural practices in River Lee, Funshion and Gradoge catchments, suspended July 2001 – 2002 due to loss of staff. In period 2000 – May 2002, 592 farms visited, 244 warning letters sent, 15 Section 12s issued, 14 Section 23s issued.
- Participation in local authority bye-law working group.
- Sectoral / Public Awareness Campaigns on environment ongoing including Byelaw Information Booklet, seminars on REPS and NMPs, Green Bus, Council website, educational tours, co-operation with industry, presentation to Strategic Policy Committee.
- Survey of Pig Production units ongoing.
- Planning Dept refer forest felling and establishment applications and housing estate applications to Environment Dept.
- Working groups ongoing in relation to Farms, Agricultural Bye-laws, Water Resources, Industry, Sanitary Services and River Basin Management Systems
- Ongoing liaison with IFA, LGCSB, EPA, Teagasc, Coillte etc.
- Additional Clean Water Lab and Wastewater Lab equipment purchased, quality control systems ongoing.
- Director of Service appointed to develop IT, Communications and GIS requirements within Council.
- MapInfo GIS datasets being populated with data including monitoring sites and locations of industries, WWTPs, farms surveyed etc.
- Lake monitoring increased from 4 to 26 lakes.
- Regular site visits made to non-IPC industries to discuss non-compliances and agree action programmes, monitoring ongoing.
- Priority list of 25 WWTPs drawn up for investigation/review of operations, phosphate monitoring of larger WWTPs ongoing.
- Priority list of 16 IPC and 9 non-IPC industries drawn up for further investigation or discussion with EPA as appropriate.
- Infrastructural and Development Programmes are being advanced by Sanitary Services through the 1999 Rural Towns and Village Schemes, the Proposed Accelerated Programmes 1997-2001 & 2002-2006 and the Serviced Land Initiative 2001-2004.
- Foul and surface drainage systems being surveyed and upgraded in certain areas.
- Teams of scientists, technicians and administrative staff to be appointed to wastewater, water quality and agricultural sections.

Cork City Council

SUMMARY OF WATER QUALITY STATUS

- The EPA has no river biological monitoring stations in the functional area of Cork City.
- One lake, known as The Lough, was monitored in the baseline survey and recorded to be of hypertrophic status – a decline from the baseline mesotrophic status and therefore not compliant with the Regulations.

ADDITIONAL MEASURES PROPOSED

- Investigate the possibility of providing an extra water supply to the Lough to improve flushing.
- Bird count and flow measurement studies to begin shortly.
- Consultation with public representatives, community groups, wildlife groups, fishery interests, South Western Regional Fisheries Board and other interested parties.

PROGRESS IN MEASURES BEING IMPLEMENTED

- A new exit drain was installed in 2001.
- Study carried out on the sources of phosphate contamination of the Lough.
- Monthly monitoring of Lough water quality underway.

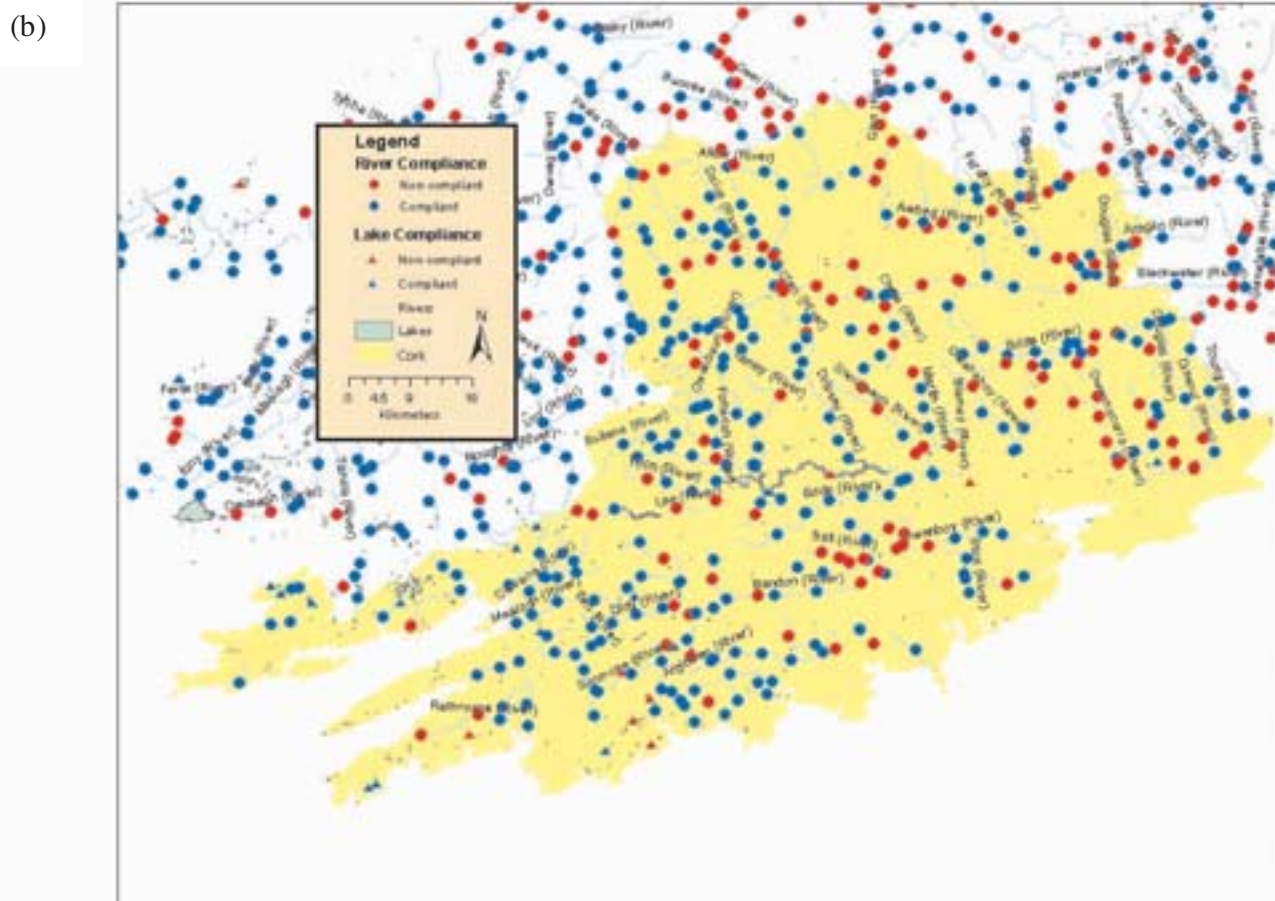
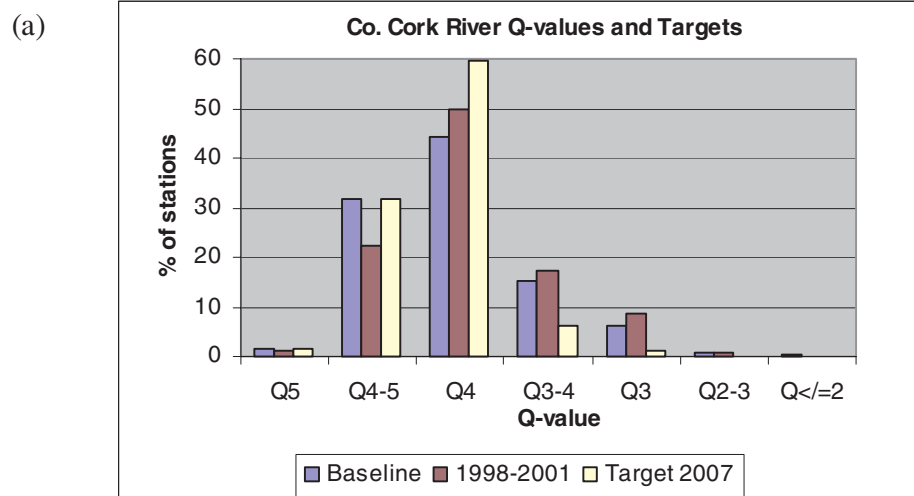


Figure 4(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Cork.

Donegal County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight decline in water quality with 76.5 per cent of stations currently of satisfactory quality compared to 76.9 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 58.4 per cent comply with the standards set in the Regulations, down 0.6 per cent from the last report.
- 58.4 per cent of stations meet the biological targets of the Regulations, down 0.6 per cent from the last report.
- There has been a serious decline in the number of high quality Q5 stations, down from 31 in the baseline survey to 15 currently.
- Donegal has a relatively high number of seriously polluted stations (12) compared to any other county.
- There are 48 lakes in the county that fall under the Regulations, 31 of these were recently monitored and 7 of these were not compliant (Loughs Anure, Columbkille (Milford), Fad (West), Kindrum, Kinny, New and Port).

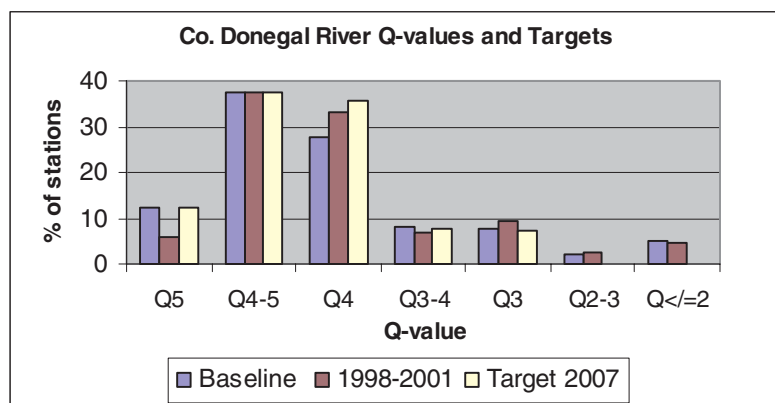
ADDITIONAL MEASURES PROPOSED

- Upgrade/construct WWTPs including Merville, Ballyshannon Rossnowlagh, Letterkenny and Carndonagh. Draft list of schemes in Measures Report.
- Pollution from several additional WWTPs noted, including those at Carrigans, Ballintra, Kilmacrennan, Milford and Dungloe.
- Swilly Catchment Management Plan to be implemented as part of Northwest River Basin District.
- Foyle Catchment Management Plan to be finalised.
- Plans to develop new laboratory facility ongoing.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Standing Committee on Pollution ongoing – discusses all environmental issues including farm management and aquaculture.
- Meeting with major aquaculture developer held to improve discharge to Tullaghobegly River from this source. Planning permission for new treatment works obtained.
- Monitoring and licensing of industrial discharges under Water Pollution Act ongoing. Stricter conditions being applied.
- Improvement in discharge from Killybegs Fish Processing plant and other processors following installation of effluent treatment and clean technology.
- Sludge Management Plan adopted by Elected Members, Teagasc involvement.
- Sludge Management Plan involved high level of co-operation with agricultural sector.
- Donegal Bay Catchment management plan prepared and circulated, Fishery Board involvement.
- Teagasc advice always sought in control of agricultural pollution problems.
- Continuous programme of farm surveying in operation.
- Waste Management Plan has been published and adopted by Elected Members.
- Two EPA waste licences obtained for Churchtown and Muckish landfills - leachate treatment being installed at both landfills and Churchtown landfill has closed. Two new landfill sites have been identified (Meenabol and an extension at Ballinacarrick).
- Industrial pollution of Aigh River stopped.
- Additional lake and river monitoring ongoing.
- Ballybofey/Stranorlar WWTP operational and new treatment plant commissioned by major bottling plant, resulting in improvements in River Finn water quality.
- Environmental Awareness Officer implements educational programme to all Primary schools and many Secondary schools.
- Monitoring effects of aerial fertilisation of forestry at a number of sites.
- A number of minor agricultural pollution incidents dealt with, Section 12 Notices issued where appropriate.

(a)



(b)

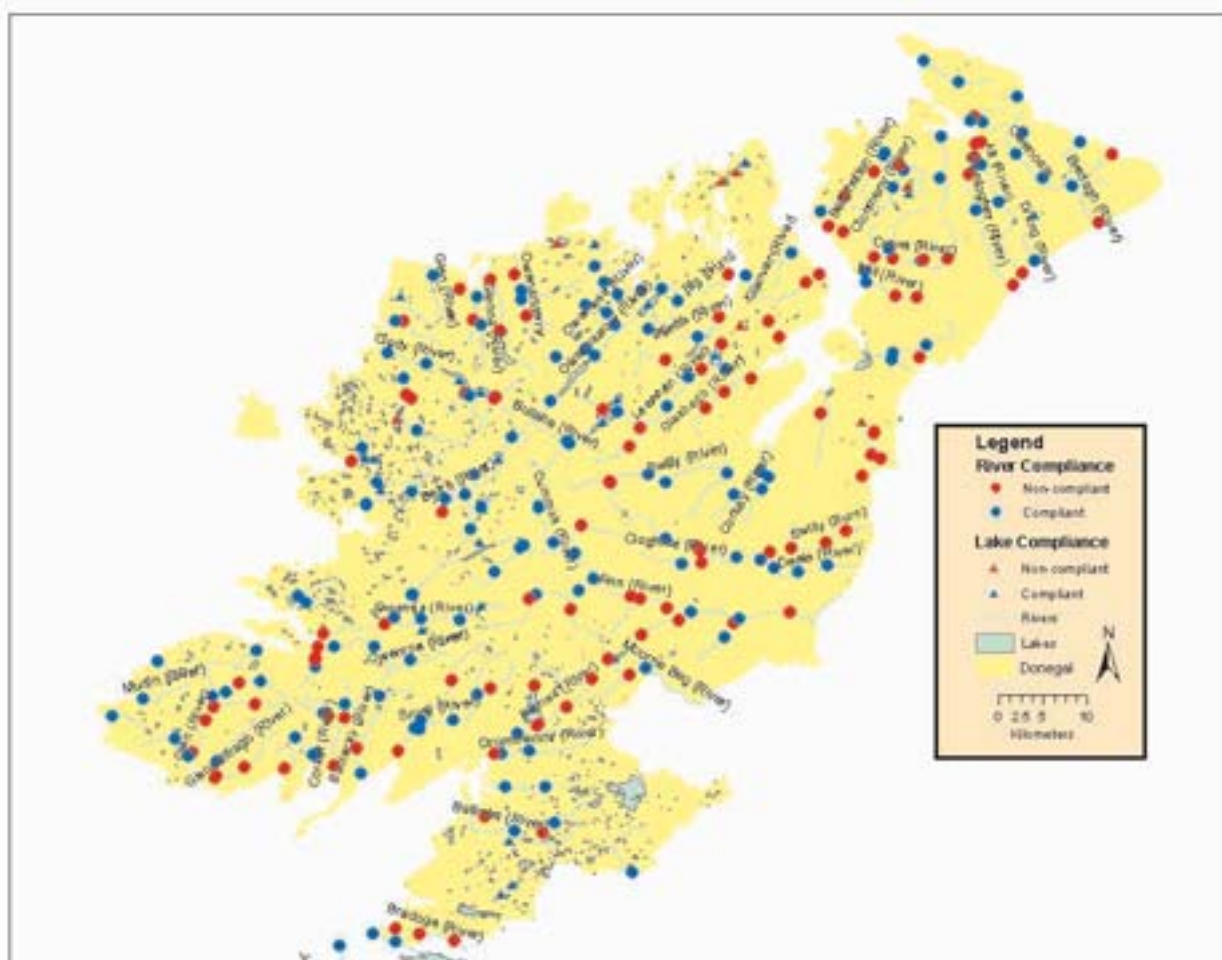


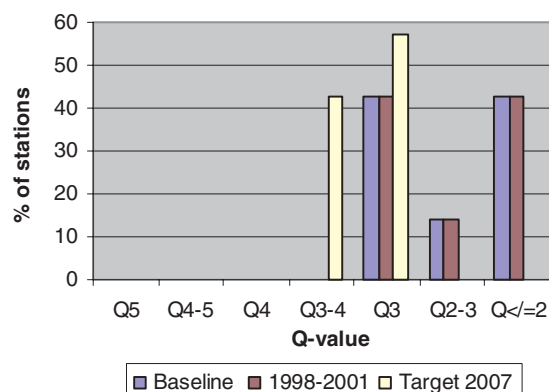
Figure 5(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Donegal.

Dublin City Council

SUMMARY OF WATER QUALITY STATUS

- There are no stations currently of satisfactory water quality, which is the same situation as pertained in the baseline 1995-1997 survey.
- Of stations monitored in 1998-2002, 85.7 per cent comply with the standards set in the Regulations, up 42.9 per cent from the last report.
- 14.3 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- Increased compliance with the Regulations has been due to significant phosphate reductions at most stations.
- There is still a relatively high proportion of stations with seriously polluted waters and no stations of satisfactory water quality.

Dublin City River Q-values and Targets



PROGRESS IN MEASURES BEING IMPLEMENTED

- 58 applications for discharge to sewers and one application for discharge to water were screened for phosphates in period from July 2000 – July 2002.
- Licence applicants encouraged to use phosphate free detergents where possible.
- Monitoring of trade and sewage effluents carried out following licensing.
- Flow meters and OTT dataloggers installed at three locations.
- Construction of North Fringe foul sewer to be completed in March 2003.
- Greater Dublin Drainage Strategy Project commenced in 2001 and is ongoing.
- Liaison with neighbouring Local Authorities to reduce incoming phosphate in rivers ongoing.
- Regular contact between the four Dublin local authorities and Central Laboratory on implementation of phosphate monitoring programmes.
- Diversion of Saggart foul sewage effluent to Dublin Drainage System has significantly reduced MRP in River Camac.
- Measures and First Implementation Report sent to all stakeholders.
- Additional phosphate monitoring of sites carried out to meet sampling requirements of Regulations.
- Survey to locate housing estate misconnections of foul wastewaters to surface water systems was carried out in Camac, Santry and Tolka catchments. To be extended to industrial estates and to Dodder catchment.
- Wetland constructed in early 2000 in the River Tolka catchment.
- 110 inspections in Camac catchment (2 misconnections, both rectified); 3,766 inspections in the Santry catchment (342 misconnections, 305 rectified); and 90 inspections in the Tolka catchment (10 misconnections, all rectified).

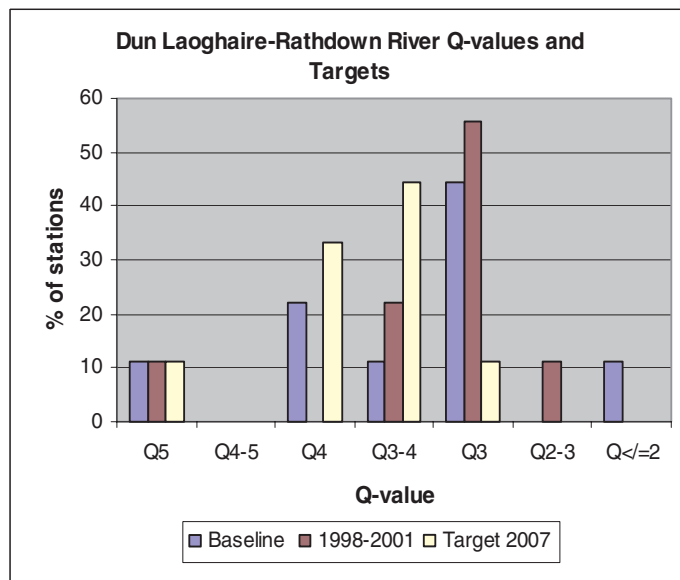
ADDITIONAL MEASURES PROPOSED

- Upgrade foul sewerage systems in Rathmines and Pembroke.
- Commencement of the Greater Dublin Drainage Strategy and the Eastern RBD project are expected to improve quantitative and qualitative river data, and development of a GIS and river flow database.
- Conduct surveys of algal/weed growth.
- Additional Q-value surveys to be carried out.
- Set up a Phosphate Measures Group including all stakeholders.
- Recruit staff to help implement Regulations.
- Extension sought under Article 3(9) as compliance with target phosphate concentrations largely outside direct control of Dublin City and is dependent on major engineering works being carried out by neighbouring local authorities.

Dun Laoghaire-Rathdown County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality with 11.1 per cent of stations now of satisfactory quality compared to 33.3 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 44.4 per cent comply with the standards set in the Regulations, up 33.3 per cent from the last report. This has been largely due to increased MRP monitoring, rather than improvements in water quality.
- 11.1 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- There is still a relatively high proportion of stations with moderately polluted waters and only one station of satisfactory water quality.
- There has been a decline in water quality at two previously satisfactory stations, but an improvement has been recorded at the seriously polluted station.



PROGRESS IN MEASURES BEING IMPLEMENTED

- Stakeholders (forestry, fisheries, landholders) contacted to discuss actions to reduce discharges.
- Liaison between planning and environment sections ongoing.
- MRP sampling program in place at EPA monitoring stations and at additional points, may be expanded further.
- Assistant Engineer appointed to oversee pollution activities.
- Discharge licences being reviewed on an ongoing basis.
- Ongoing assessment of distribution and effectiveness of septic tanks through liaison with landholders.
- Drainage systems being surveyed in the Deansgrange catchment to rectify misconnections through liaison and Section 12 notices where necessary. Of 112 houses recently visited access was gained to 86, 23 of which had misconnections.

ADDITIONAL MEASURES PROPOSED

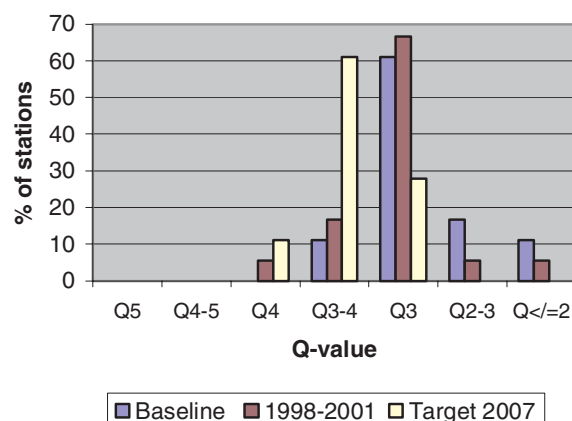
- Prepare water quality management plans for individual catchments.
- Seek external stakeholder involvement where appropriate in the development of future management plans and measures.
- Improve communication with licence applicants, 'misconnected' homeowners etc.
- Liaise more closely with Council environmental education officers.
- Environment section proactive involvement in development of county's long-term planning strategy.
- Prepare aquifer protection plan for Glencullen Stream catchment and determine if other plans are needed elsewhere.
- Misconnection survey planned for Shanganagh River catchment.
- Prepare a GIS database for the storage and review of information.
- Budget to be established for pollution program and further staff appointments envisaged.
- Develop public education and advisory measures.
- Investigate availability of funds to carry out works to minimise risk of stormwater overflow at Kilmacud and other locations. Endeavour to operate system to achieve same.
- Assess fertilization of agricultural areas, golf courses etc.

Fingal County Council

SUMMARY OF WATER QUALITY STATUS

- There is currently one station of satisfactory water quality compared to none in the baseline 1995-1997 survey.
- Of stations monitored in 1998-2002, 38.9 per cent comply with the standards set in the Regulations, up 11.1 per cent from the last report, which has been due to reductions in phosphorus levels.
- 38.9 per cent of stations meet the biological targets of the Regulations, up 11.1 per cent from the last report.
- There has been a reduction in the number of moderately and seriously polluted stations and one station has been recorded as satisfactory, whereas there were no satisfactory stations in the baseline survey.

Fingal Co. Co. River Q-values and Targets



PROGRESS IN MEASURES BEING IMPLEMENTED

- Sludge Management Plan adopted - recommends NMP and regulation of fertiliser use throughout Fingal.
- Participation in Eastern River Basin Management District System.
- Farm surveys, on site treatment systems surveys and unlicensed discharge surveys commenced in Hurley River catchment, database set up.
- Catchment Envisage installed, staff trained by LGCSB.
- Regular liaison with IFA, Teagasc, Aer Rianta (re Dublin Airport) and other local authorities.
- Presentation on Regulations made to Environmental Services and Parks Strategic Policy Committee.
- Implementation of Code of Good Farming Practice through investigation of breaches and notifying the DAFRD of prosecutions.
- Phosphorus limits included in discharge licences.
- Full time sampler appointed in 2002 and new monitoring equipment purchased, allowing more site inspections and monitoring of rivers and point sources.
- Monitoring of Garristown, Naul, Colecot, Oldtown, Ballboghill, Toberburr and Balgriffen WWTP effluents ongoing.
- Substantial work carried out in Swords area upgrading sewers and diverting surface water.
- Water quality management plan for the Tolka River catchment reviewed.
- Carry out pollution investigations.
- Regarding the River Liffey, Fingal County Council will co-operate with the implementation of measures recommended by the Three Rivers Project.

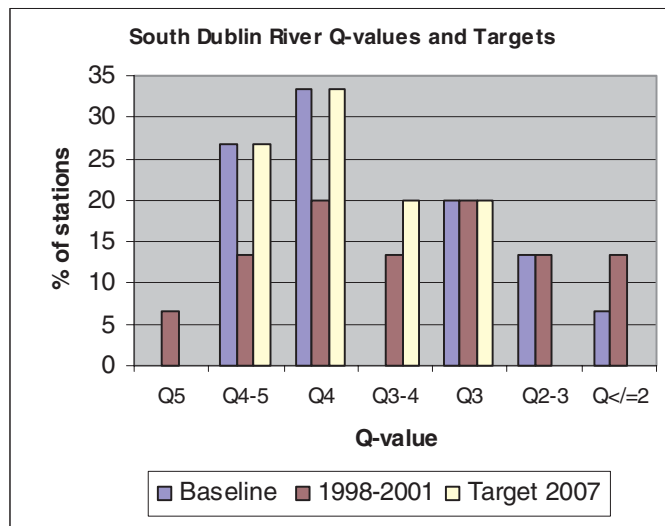
ADDITIONAL MEASURES PROPOSED

- Council to draft bye-laws to control fertiliser use and implement NMP throughout county, liaison with other local authorities ongoing.
- Discharge licences under Water Pollution Act to be reviewed.
- Increase sectoral and general public awareness of Regulations.
- Set up liaison structures for implementing measures on a catchment basis.
- Upgrade Garristown, Naul and Oldtown WWTPs, including P removal.
- Address surface water infiltration in foul drainage system at Garristown, carry out flow survey.
- Upgrade hydrometric station network to establish phosphorus loads, liaison with EPA.
- Council to draft water quality management plan for Broadmeadow estuary and catchment.
- Toberburr WWTP to be decommissioned and drainage network connected to Swords.
- Balgriffen WWTP to be decommissioned and drainage network connected to North Fringe sewer.
- Drainage network in urban areas to be modelled under Greater Dublin Strategic Drainage Study to identify substandard sections in need of upgrading.
- Set up dedicated crew to remedy house misconnections in urban areas.

South Dublin County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality in South Dublin with 40 per cent of stations now of satisfactory water quality compared to 60 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 73.3 per cent comply with the standards set in the Regulations, up 6.7 per cent from the last report.
- 33.3 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- Increased compliance with the Regulations has been due to increased MRP monitoring, although there have been some reductions in MRP levels recorded.
- There has been an increase in the number of seriously polluted stations (from one to two) from the baseline survey and a decline in the number of satisfactory stations from 9 to 6.



PROGRESS IN MEASURES BEING IMPLEMENTED

- River MRP monitoring programme augmented; additional monitoring stations proposed.
- Newcastle and Saggart WWTPs decommissioned and foul drainage from these areas have been connected to the main trunk sewers for treatment at Ringsend WWTP.
- Inspector has been appointed to carry out a misconnections survey, which commenced in 2001, concentrating on urban areas initially.
- As part of misconnections survey, the public are being informed of importance of separation of foul and surface waters.
- Measures report sent to all Dublin local authorities; liaison will be extended to other local authorities in Liffey catchment also.

ADDITIONAL MEASURES PROPOSED

- Review all Section 4 licences by 2007.
- Use powers under Water Pollution Acts to protect water quality.
- Extension of phosphorus monitoring and measures programme to tributaries, such as the Griffeen River.
- Determine amount of MRP in rivers entering the functional area from neighbouring local authorities.
- Carry out groundwater monitoring, farm surveys and require nutrient management plans where necessary.
- Possible introduction of bye-laws to control agricultural activity.
- Carry out public education campaign and consultation with concerned groups.

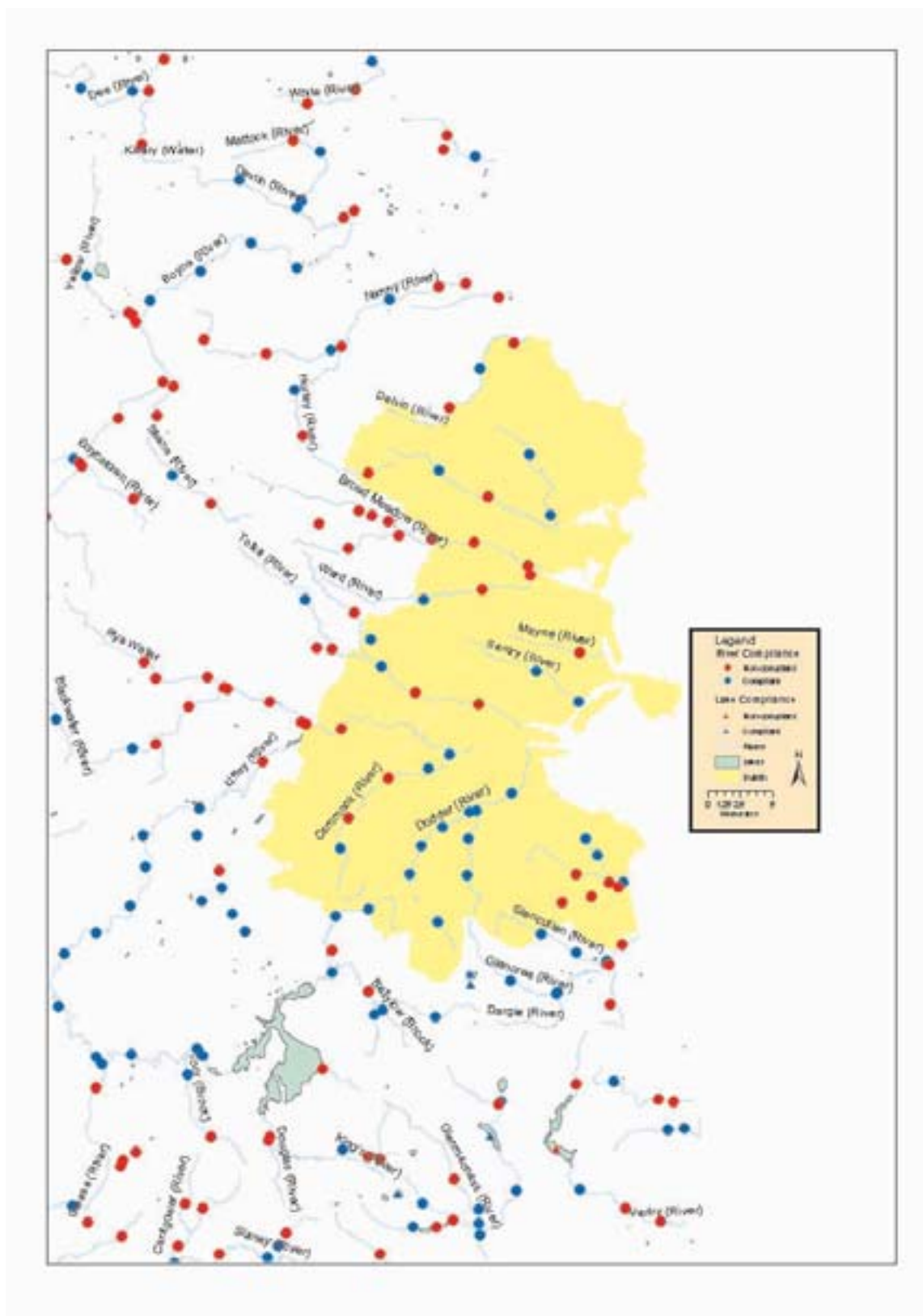


Figure 6. River compliance with Phosphorus Regulations in County Dublin.

Galway County Council & Galway City Council

SUMMARY OF WATER QUALITY STATUS

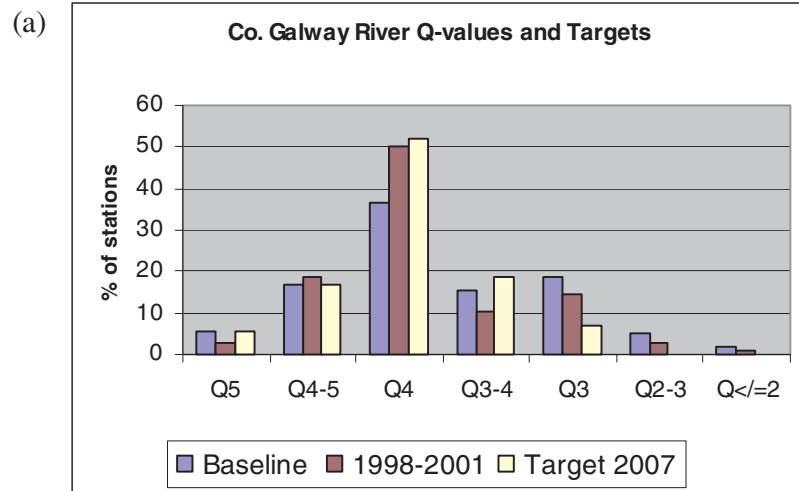
- Since 1995-1997 there has been a considerable improvement in water quality with 71.4 per cent of stations currently of satisfactory quality compared to 58.9 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 67.5 per cent comply with the standards set in the Regulations, down 1.4 per cent from the last report, which is largely due to decreased MRP monitoring.
- 67.1 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- There has been a serious decline in high quality Q5 stations, down from 13 in the baseline survey to 6 currently.
- However there has also been an improvement in many moderately and seriously polluted stations, from 59 in the baseline survey to 42 currently.
- There are 81 lakes in the county that fall under the Regulations, 40 of these were recently monitored and 8 of these were not compliant (Loughs Anillaun, Aunierin, Ballynahinch, Ballynakill, Cutra, Nahasleam (East), Natawneymore and Rea).

PROGRESS IN MEASURES BEING IMPLEMENTED

- Galway City has stated in a letter to the Agency that Galway County Council discharges the Water Pollution Control function in Galway City pursuant to an agreement between the Council and the City.
- New Portumna wastewater collection and treatment system completed and in operation.
- Oranmore sewage collection system completed.
- New WWTPs operational include Moycullen (2002) and Loughrea (2001).
- Improved systematic referral system between Council Planning and Environment functions.
- Terryland river investigations have identified discharge points, investigation ongoing.
- Carrowmoneash stream investigations have resulted in major cleanup, minor pollution investigations ongoing.
- 48 farm surveys took place in Suck catchment in 2000.
- Review of effluent discharge licences (80 reviewed) - phosphate limits on discharges reduced and monitoring in place.
- Four Section 12 Notices issued.
- Laboratory facilities improved as lachate system purchased which measures Total Phosphorus.
- Council staff participate in seminars relating to REPS and water quality.
- Environmental Information Management System introduced with register of pollution complaints and follow up actions taken. Enforcement of the Water Pollution Acts where necessary.
- Two Environmental Awareness Officers appointed.
- Waste minimisation being promoted – two town recycling schemes in operation.

ADDITIONAL MEASURES PROPOSED

- Construct/upgrade WWTPs to comply with the EU Urban Waste Water Treatment Directive and provide phosphorus reduction facilities where necessary.
- WWTPs to be upgraded / constructed include Galway City and Oranmore, Clonbur, Letterfrack, Leenane and Tully (2003), Oughterard, Dunmore, Kilkerrin, Clifden (2004), Aughrim, Caltra, Creggs, Kilconnell, Laurencetown, Clarinbridge, Kinvara, An Spidéal, Casla, Woodford, Eyrecourt, An Cheathrú Rua, Ahascragh, Glennamaddy, Mountbellew, Headford, Kilronan, Athenry, Craughwell, New Inn, Kinvara and Roundstone (2006).
- Tuam WWTP collection system to be upgraded 2006-2008.
- Pump Bearná sewage to Galway WWTP (2006).
- Extend Athenry and Loughrea collection systems (2006).
- Closer liaison with EPA on IPC licensed facilities.
- Possible introduction of agricultural by-laws.
- Serve notices under the Water Pollution Acts requiring nutrient management planning from large pig and poultry units.
- Additional staff recruited to carry out more farm surveys in Woodford/Coos, Kilcrow/Cappagh, Suck, Shannon Corridor and Shannon Estuary North catchments. Staff trained in Farm Envisage.
- Carry out septic tank surveys and strengthen control of discharges through Planning.
- Western and Shannon River Basin Management Projects proposed to commence in 2003. Separate catchment management plans, groundwater protection plan and comprehensive monitoring programme to be prepared as a result of these projects. GIS to be used. Stakeholder groups and public education campaigns to be established under RBM projects (Corrib Catchment Task Force not reconstituted).
- Ballinasloe landfill being upgraded with new lined cells and leachate collection system.



(b)

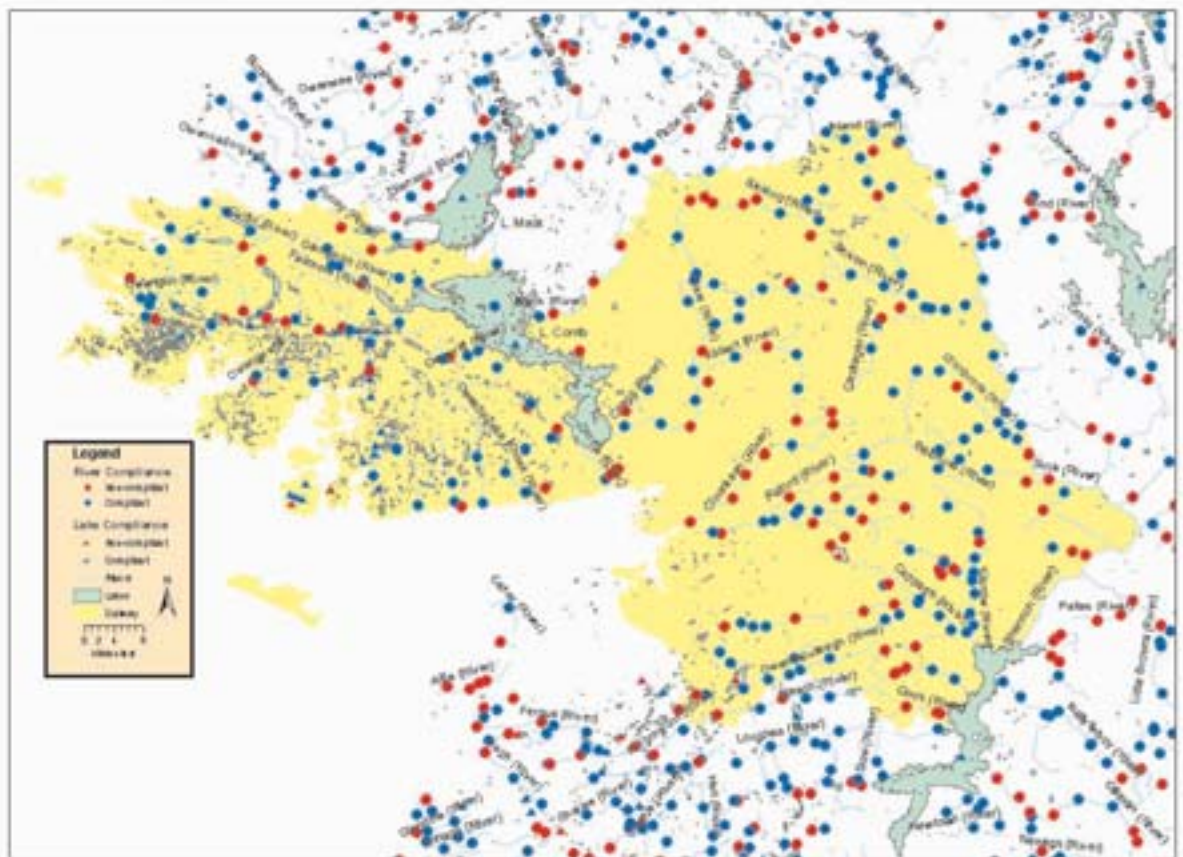


Figure 7(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Galway

Kerry County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-97 there has been a slight improvement in water quality in Kerry with 77.3 per cent of stations currently of satisfactory quality compared to 76.4 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 79.1 per cent comply with the standards set in the Regulations, up 6.2 per cent from the last report, which is largely due to increased MRP monitoring.
- 66.5 per cent of stations meet the biological targets of the Regulations, down 3.1 per cent from the last report.
- There has been a serious decline in high quality Q5 and Q4-5 stations, down from 82 in the baseline survey to 68 currently.
- However there has also been an improvement in some of the seriously polluted stations, from 3 in the baseline survey to 1 currently.
- There are 8 lakes (or parts of lakes) in the county which fall under the Regulations, 7 of these were recently monitored and 2 of these were not compliant (Loughs Gill and Leane (Ross Bay)).

ADDITIONAL MEASURES PROPOSED

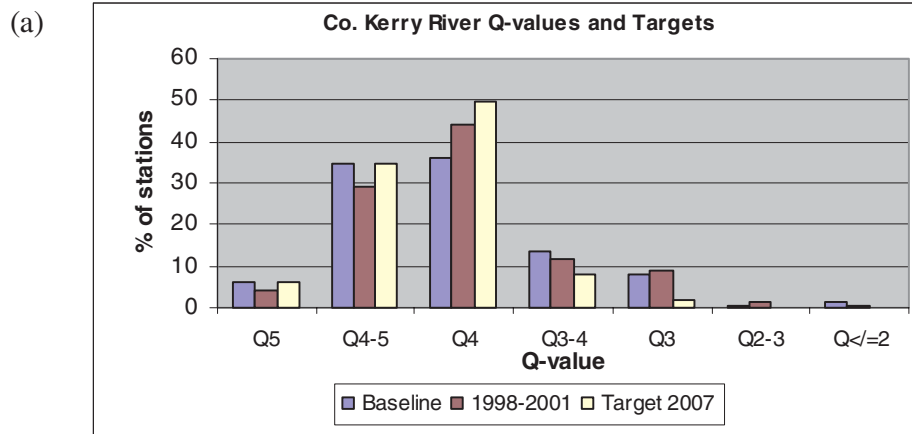
- Establishment of Shannon and South Kerry / Cork RBD projects.
- Improve liaison with other local authorities in RBD projects.
- Establish county-wide water quality consultative forum.
- Expand laboratory facilities.
- Assess possibility of requiring Nutrient Management Planning.
- Installation of a catchment GIS.
- Obtain funding for staff and laboratory resources.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Water Pollution Act enforcement ongoing.
- Ongoing Section 4 and 16 licence issue, review, monitoring, auditing and enforcement.
- Closer integration of planning and environment functions.
- Monitoring and upgrading of WWTPs ongoing (Farranfore and Ballyheigue WWTP construction commenced).
- Survey and proposals for upgrading certain foul water sewer / drainage systems (e.g., Ardfert, Milltown and Furies).
- 171 pollution investigations, 42 Section 12 Notices, 3 prosecutions taken.
- Closure plans prepared for a number of landfill sites; Muingnamine landfill still operational; waste composting and recycling scheme instigated in Killarney.
- Draft Sludge Management Plan prepared.
- Farm surveys completed in Ballylongford and Tarbert River catchments, to be extended to other catchments, improved farm management promoted.
- Closer liaison with Forest Service, EPA, Fisheries, farming organisations, elected members, public etc.
- Expanded river / lake / groundwater monitoring programme ongoing.
- Monitoring integrated with EPA programme.
- Biological monitoring programme established.
- Development and installation of computer based lab data storage and handling system; lab procedures manual established; lab undergoing EPA Inter-calibration Programme
- Environment Awareness Officer appointed, newspaper articles published.
- Lectures given by staff at REPS courses and to various organisations.
- Continue and expand Multi-Sectoral and Public awareness campaigns.
- Recruitment of staff in Council Environment section.

Additional progress specific to Lough Leane catchment includes:

- Continued operation of Steering Group and Multi-Sectoral Working Group. Awareness and Implementation Sub-Committees formed.
- Schools education programme established.
- Catchment monitoring programmes developed to determine sectoral loading and phosphorus budgets.
- Two reports published.
- Nutrient management pilot programme in sub-catchment area.
- Advisory notices in papers
- GIS developed.
- Draft agricultural bye-laws prepared, public consultation process completed.



(b)

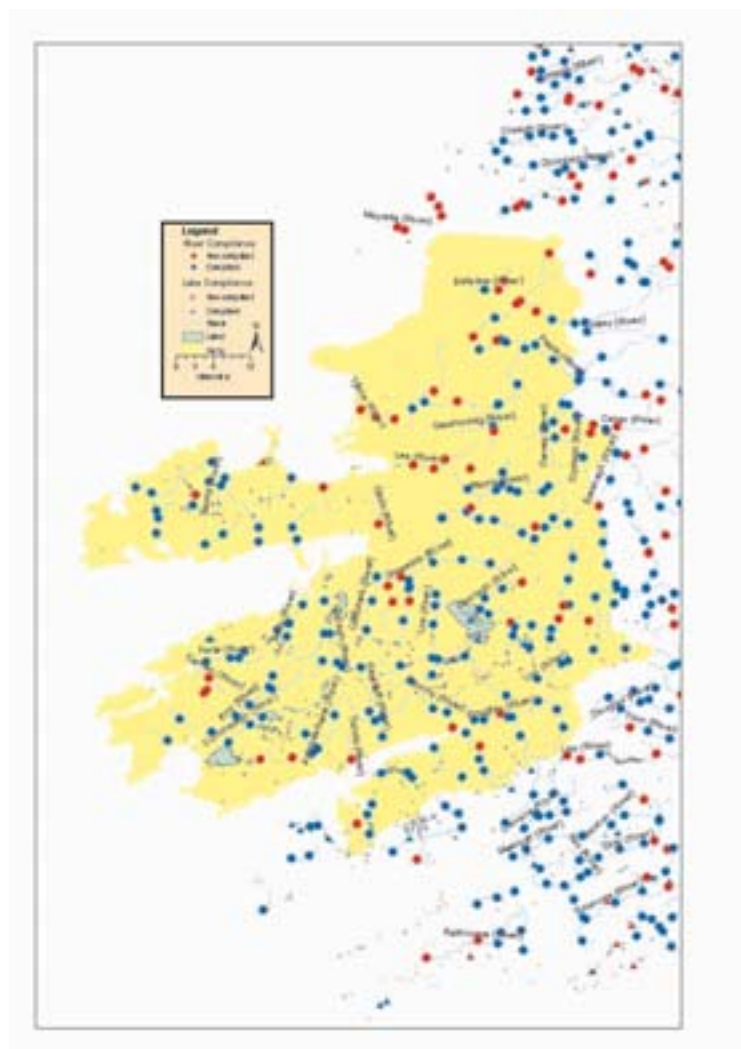


Figure 8(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Kerry

Kildare County Council

SUMMARY OF WATER QUALITY STATUS

- Current monitoring indicates that 19.5 per cent of stations in Kildare are of satisfactory status, which is the same as that pertaining during the 1995-1997 baseline survey.
- Of stations monitored in 1998-2002, 50 per cent comply with the standards set in the Regulations, up 18.5 per cent from the last report, which is largely due to increased MRP monitoring rather than improvements in water quality.
- 32.2 per cent of stations meet the biological targets of the Regulations, up 0.7 per cent from the last report.
- There has been an improvement in the number of high quality Q4-5 stations, up from 1 in the baseline survey to 4 currently.
- There has also been an improvement in some of the seriously polluted stations, from 6 in the baseline survey to 4 currently.
- However, there has been a decline in many of the slightly polluted Q3-4 stations to moderately polluted Q3 status.

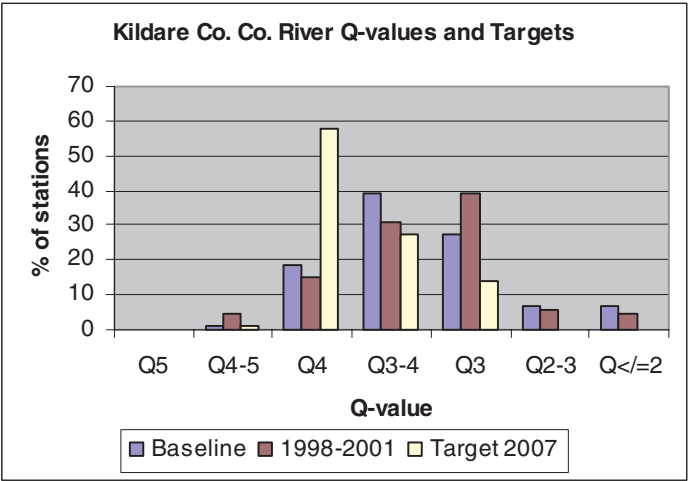
ADDITIONAL MEASURES PROPOSED

- Appoint additional staff to enforce Water Pollution Act and to carry out surveys of unauthorised discharges.
- Assess impacts of effluent from WWTPs and urban stormwater overflows and upgrade where necessary.
- Osberstown WWTP to be significantly extended and sewer network upgraded.
- New laboratory facility at Osberstown WWTP will be used for future sample analyses.
- Significant increase in farm surveys, including consultation with IFA and Teagasc.
- Council will publish annual Environmental Notice to farming community in newspapers.
- Require nutrient management planning where necessary.
- Agricultural special study area set up in Clonshanbo catchment by Three Rivers Project.
- The GSI is currently preparing a Groundwater Protection Scheme for county.
- Kildare to be involved in South East and Eastern River Basin Management Groups.

PROGRESS IN MEASURES BEING IMPLEMENTED

- New Section 4 and Section 16 licence applications being processed, and existing Section 4 and Section 16 licences being reviewed, in light of Regulations.
- Licences are being enforced with regular monitoring, site inspection and audits.
- Two new Section 4 and ten new Section 16 licences issued since July 2000. Eight Section 4 and eight Section 16 licences reviewed. Staff member responsible for licensing process.
- One prosecution taken for non-compliance with Section 16 licence, one prosecution pending. 13 Section 12 notices issued, all Section 12 Notices being reviewed.
- Surveys of unauthorised discharges to surface water and foul sewer drainage systems have commenced.
- Unlicensed activities being addressed - smaller scale businesses such as service stations now being licensed.
- Phosphorus removal installed at Osberstown and Leixlip WWTPs. New laboratory at Osberstown.
- Upgrade of Johnstown Bridge WWTP.
- Catchment Envisage GIS system being developed for management of Barrow, Boyne and Liffey catchments.
- GIS co-ordinator appointed by Council.
- MRP being monitored at 81 EPA biological stations, monitoring at eleven further stations proposed.
- Hydrometric monitoring network expanded, more work proposed.
- EPA Wastewater Treatment Manuals used by Environment Section in planning process.
- Member of staff appointed to oversee farm surveys. Farm surveys underway in Graney subcatchment (six completed).
- Promotion of Good Farming Practice/REPS.
- Council contributing £7500/yr for 3 years for limnological sampling in Rye River system.
- Work commenced on control of landspreading activities.
- Two-monthly meetings held with Environment Awareness Officer re public education/advisory measures.
- Implementation of Kildare Waste Management Plan ongoing. Landfilling ceased at Silliot Hill since March 2002, 40 bring centres provided.
- Two-weekly staff meetings held.
- Consultative structures set up under Three Rivers Project with quarterly meetings of all relevant stakeholders.
- Three Rivers Project also involved with local anglers association in investigation of poor water quality in Ryewater catchment.
- Council represented on Barrow Steering Group.
- Public education includes Schools Education Programme, Council Environmental Newsletter, Environment Partnership Fund, Barrow News, Three Rivers Project, use of Internet.

(a)



(b)

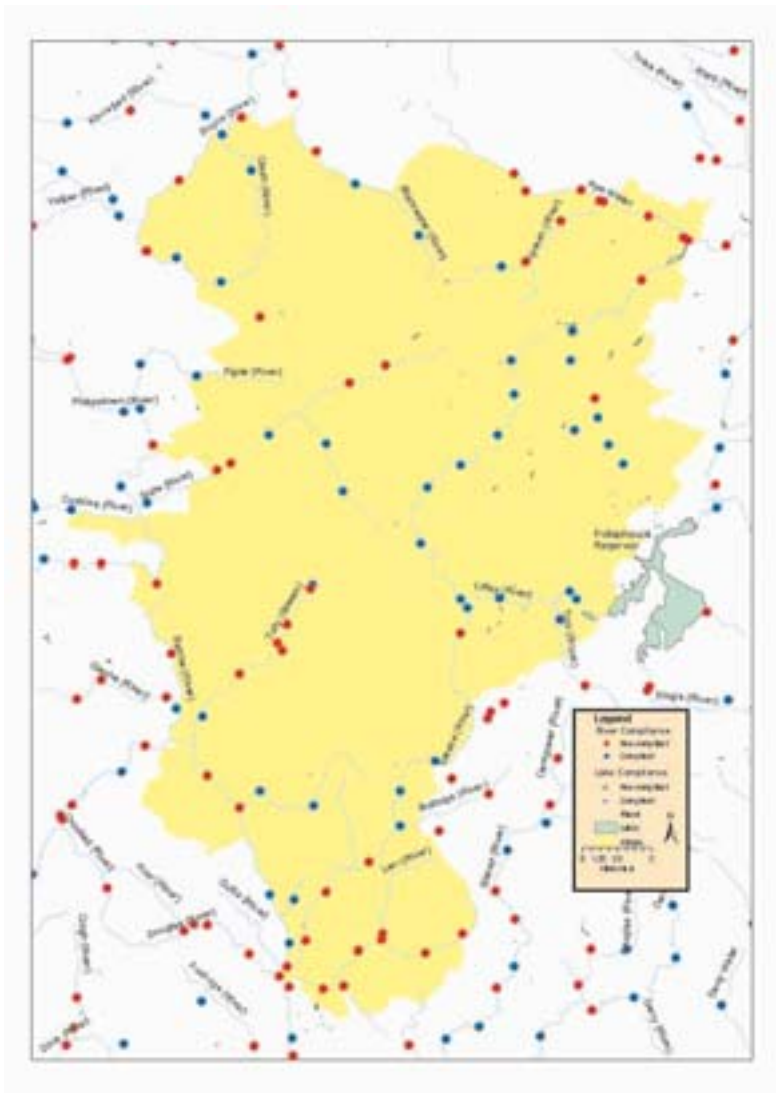


Figure 9(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in County Kildare

Kilkenny County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight improvement in water quality with 41.7 per cent of stations currently of satisfactory quality compared to 40.6 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 49 per cent comply with the standards set in the Regulations, down 9.2 per cent from the last report.
- 46.9 per cent of stations meet the biological targets of the Regulations, down 12.5 per cent from the last report.
- There has been a decline in the number of high quality Q5 stations, down from 2 in the baseline survey to 0 currently.
- However, there has been a reduction in the number of moderately polluted stations, down from 24 in the baseline survey to 14 currently.

PROGRESS IN MEASURES BEING IMPLEMENTED

- WWTPs upgraded include Thomastown, Graiguenamanagh, Coon, Skeoghvosteen, Stoneyford, Windgap, Urlingford and Castlecomer.
- Thomastown and Graiguenamanagh surface water and foul sewer drainage systems completed.
- Approximately 100 farm surveys have been completed in the last two years. More farm surveys planned.
- Continue enforcement measures.
- Participation in South East RBM System Project.
- Environmental Education Officer appointed.

ADDITIONAL MEASURES PROPOSED

- WWTPs to be upgraded include Ballyragget, Glenmore, Mooncoin, Johnstown, Callan (P removal), Tullaroan, Dunnamaggan, Kilkenny City (P removal), Kilmacow, Goresbridge, Freshford, Kilmoganny and Gowran.
- Work being carried out on Clogh & Mooneenroe, Kilmacow and Freshford surface water and foul sewer drainage systems.
- Review of all Section 4 and Section 16 licenses.
- Review discharge points whether licensed or not.
- Council plan to recommence meetings with relevant stakeholders.
- Increase river MRP monitoring programme, consultation with EPA.
- Possible recruitment of staff to deal with enforcement issues.

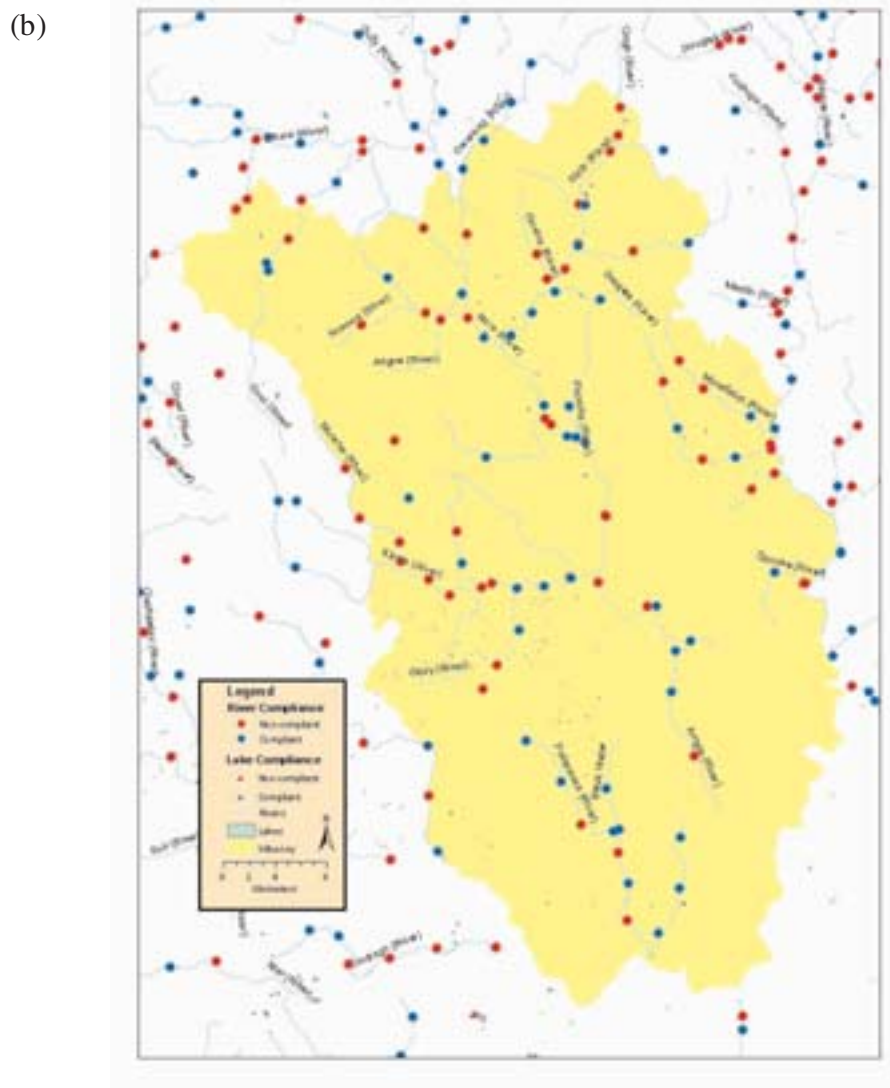
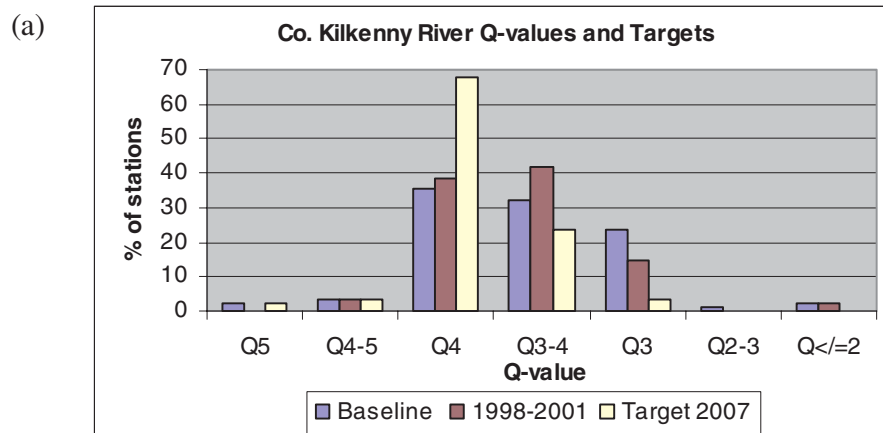


Figure 10(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in County Kilkenny

Laois County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality in Laois with 44.7 per cent of stations currently of satisfactory quality compared to 48.5 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 55.3 per cent comply with the standards set in the Regulations, down 0.5 per cent from the last report.
- 50.5 per cent of stations meet the biological targets of the Regulations, down 0.5 per cent from the last report.
- There has been a decline in the number of high quality Q5 stations, down from 3 in the baseline survey to 1 currently.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Steering Committee formed involving all stakeholders, January 2001.
- Staff member appointed to the Phosphorus Regulations.
- Three sub-committees formed – WWTPs, Industry and Farming – which prepared sectoral implementation reports.
- Pilot studies undertaken in the Donaghmore area (grassland) and the River Guilie catchment (tillage).
- River chemical monitoring, farmyard inspections and soil surveys undertaken in pilot catchments.
- Liaison with farmers, Teagasc, IFA, Fisheries Board.
- Recruitment of graduate engineer and technician.
- Catchment programmes for Nore and Barrow rivers established, technician assigned to each catchment. River monitoring, farm surveys and farmer education and awareness measures ongoing.
- Catchment Envisage and LabInfo software provided by LGCSB, major investments in computer hardware and software.
- Participation in and liaison with South East River Basin District staff e.g., on monitoring, GIS software etc.
- Measures taken to increase awareness in agricultural sector (lectures on environment, REPS).
- Groundwater protection scheme for County Laois prepared. Aquifer protection plan prepared.
- Work on laboratory quality control ongoing.

ADDITIONAL MEASURES PROPOSED

- Bye-laws to control spreading of organic industrial sludges currently under consideration, would include nutrient management planning.
- Further public education and advisory measures being developed. Liaison with farmers at a local level proposed. Use of website, council newsletter.
- GIS database under development.
- Additional pilot catchment soil sampling, river monitoring and farm surveys to be undertaken.
- Recruit additional staff.
- Consulting engineers appointed to report on Durrow, Rathdowney, Stradbally, Clonaslee, Moountrath and Abbeylisk WWTPs. Monitoring ongoing.
- Liaison with EPA on IPC licences.
- Identify, assess, license and monitor industrial activities not requiring an IPC licence, where appropriate.

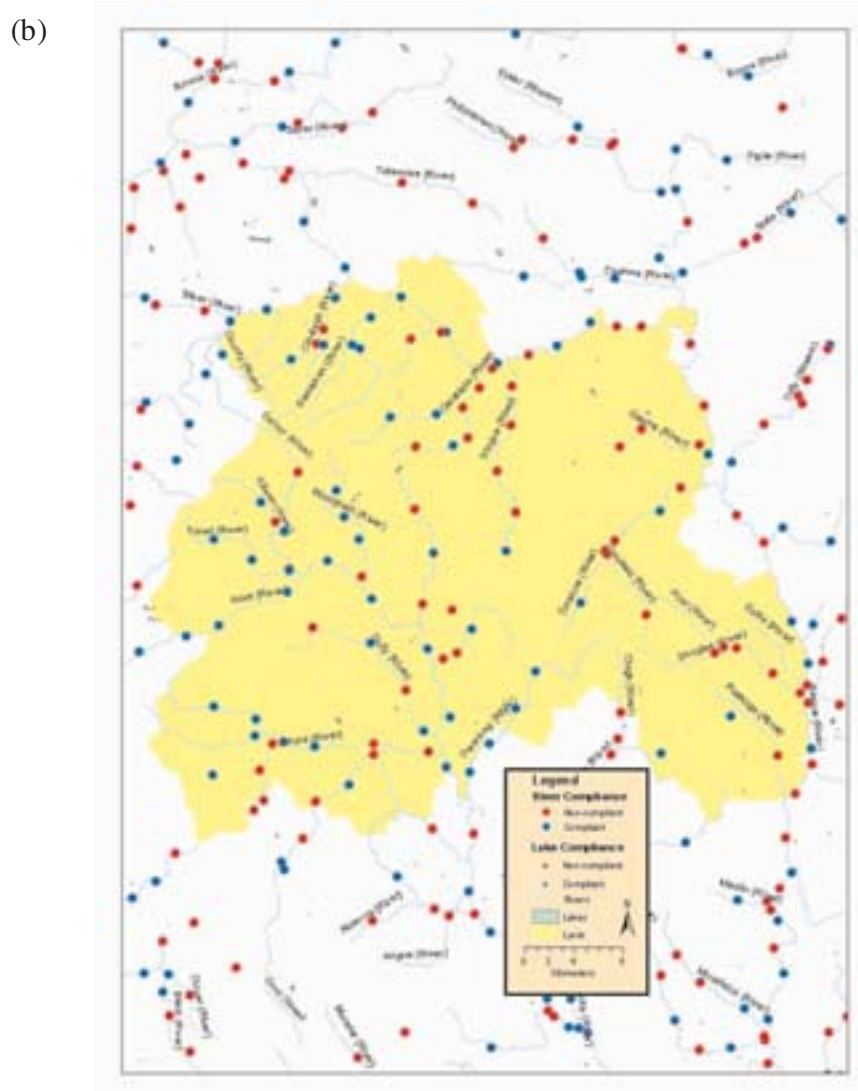
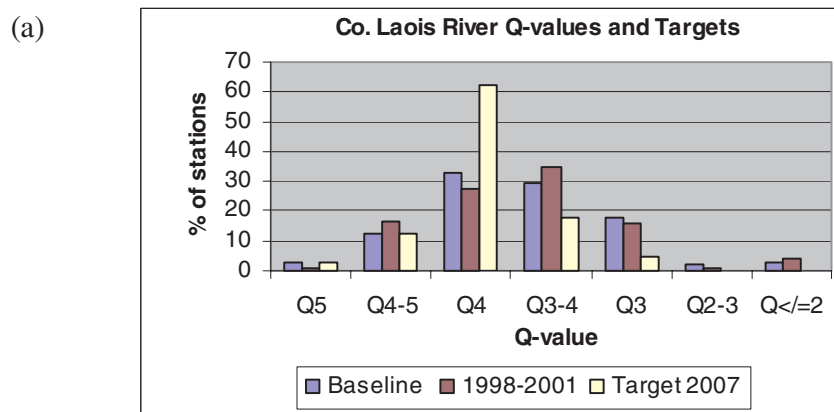


Figure 11(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in County Laois

Leitrim County Council

SUMMARY OF WATER QUALITY STATUS

- Currently 80.5 per cent of stations are of satisfactory water quality, which is the same as that pertaining during the 1995-1997 baseline survey.
- Of stations monitored in 1998-2002, 67.8 per cent comply with the standards set in the Regulations, up 3.9 per cent from the last report.
- 65.5 per cent of stations meet the biological targets of the Regulations, up 2.7 per cent from the last report.
- There has been a serious decline in the number of high quality Q5 stations, down from 9 in the baseline survey to 3 currently.
- There are 16 lakes in the county which fall under the Regulations, 15 of these were recently monitored and 5 of these were not compliant (Loughs Acres, Calloughs, Gangin, Melvin and Rinn).

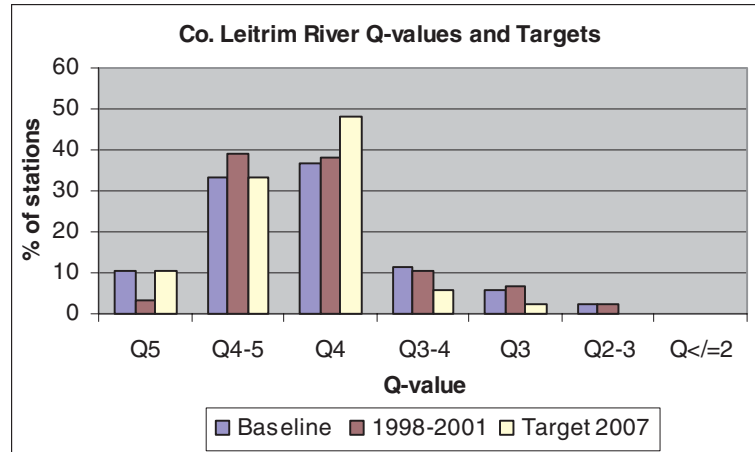
PROGRESS IN MEASURES BEING IMPLEMENTED

- 50 farm surveys undertaken in the Shannon catchment, 7 in the Lough Gill catchment. Follow-up action being undertaken.
- Licensing of discharges to waters and sewers commenced.
- Pollution investigations ongoing.
- Presentations given to farming groups, more planned.
- Two environmental technicians appointed.
- Liaison with Coillte re clearfelling ongoing.
- Council requesting a nutrient management plan to accompany new planning applications for slatted shed developments.
- Pilot scheme in operation between environment and planning section stipulating that new developments must have adequate sewage treatment.
- Attendance at Lough Melvin Catchment Management Meetings.

ADDITIONAL MEASURES PROPOSED

- Upgrade WWTPs at Carrick on Shannon (by 2005) and construct WWTP at Fenagh by 2003.
- WWTPs to be installed or upgraded at Tullaghan, Kinlough, Kiltyclogher, Kilargue, Dromahaire, Drumkeerin, Cloone, Roosky, Jamestown, Drumcong and Ballinaglera by 2004.
- Upgrades planned for Mohill (2004) and Drumshambo (2005) WWTPs, to include P removal.
- GSI preparing Groundwater Protection Plan for County.
- Information being gathered for preparation of catchment water quality management plans.
- Pilot project underway to determine best alternative to soil attenuation of septic tank effluent.
- Use of Water Pollution Act to require nutrient management planning. Section 23 notices issued.
- Upgrade hydrometric monitoring in Lough Melvin catchment, liaison with EPA.
- Review licensed discharges.

(a)



(b)

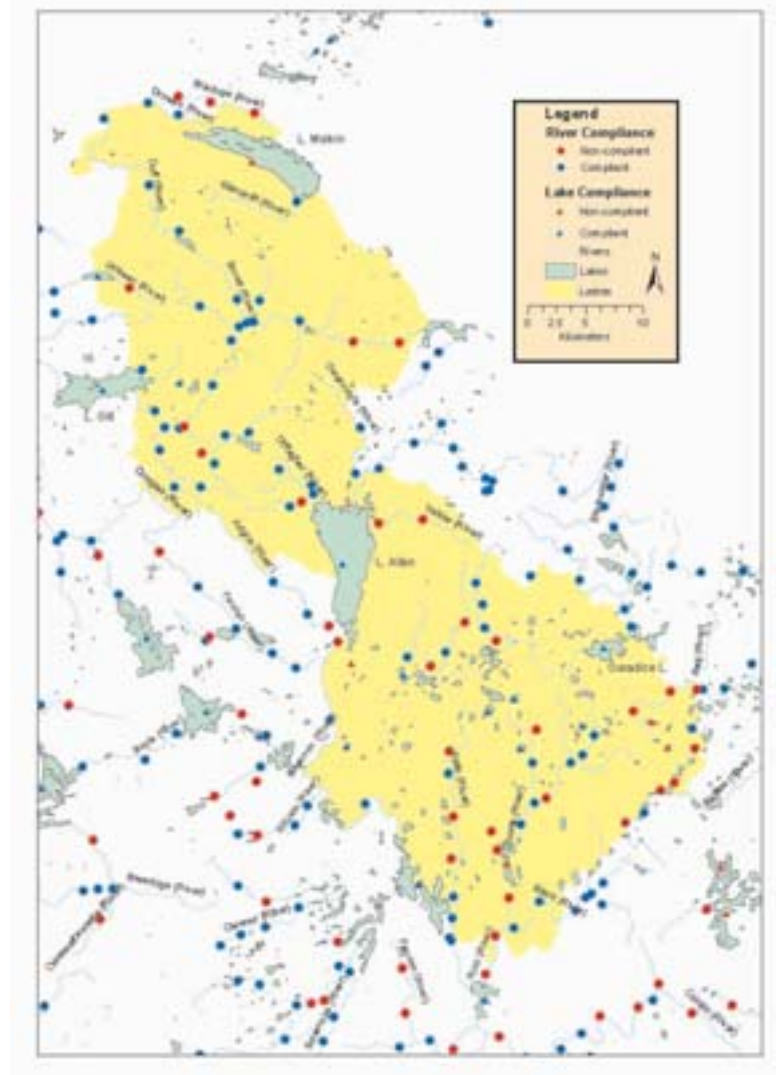


Figure 12(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Leitrim

Limerick County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in water quality with 47.2 per cent of stations currently of satisfactory quality, compared to 44.9 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 52 per cent comply with the standards set in the Regulations, down 1.6 per cent from the last report.
- 49.6 per cent of stations meet the biological targets of the Regulations, down 3.1 per cent from the last report.
- There has been a decline in the number of high quality Q5 and Q4-5 stations, down from 18 in the baseline survey to 14 currently.
- However, there has been a reduction in the number of seriously polluted stations, down from 4 in the baseline survey to 2 currently.
- Lough Gur is currently eutrophic and non-compliant with the Regulations.

ADDITIONAL MEASURES PROPOSED

- Farm surveys planned for Bunoke River catchment and introduction of nutrient management planning where appropriate. Committee of relevant stakeholders formed and meetings held. To be extended to other catchments.
- Limerick County Council to co-ordinate Shannon RBM Project proposed under Water Framework Directive.
- Implementation of the Three Rivers Project, which covers the River Aherlow, subsumed into South Eastern RBM Project.
- Carry out more comprehensive licensing of trade effluent discharges with auditing, reviews and enforcement where necessary.
- 31 WWTP schemes prioritised in Assessment of Needs Report 2000-2006, and 41 included for 2006-2020 – all upgraded plants which discharge to freshwater will include phosphorus removal.
- Carry out septic tank surveys.
- Monitoring of storm water overflows to be introduced.
- Appoint Agricultural Scientist to oversee implementation of Nutrient Management Planning, encourage REPS uptake and carry out liaison with farming groups.
- Annual auditing of measures.
- Possible introduction of agricultural bye-laws, depending on success of co-operative approach with farmers and on the Nitrates Directive.
- Article 3(9) extension of six years sought for unsatisfactory rivers in county.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Phosphorus Regulations team including an Agricultural Scientist, two Graduate Scientists and a Technical Officer being established.
- River and lake monitoring programmes enhanced. River MRP monitoring increased. Biological monitoring used in pollution investigations. New laboratory equipment purchased to measure Total P in lakes.
- Hydrogeological study of Lough Gur underway.
- Monitoring of WWTPs ongoing, composite samplers being installed.
- Real time monitors installed on the Deel and the Feale.
- GIS system under development.
- All existing licences have been audited and, since last report, reviews of four Section 4 and seven Section 16 licences have been initiated.
- Seven Section 12 Notices issued to commercial premises and one successful prosecution taken.
- 33 commercial enterprises with potential to impact on water quality currently identified and undergoing licensing procedure.
- New discharge licence applications assessed in light of Regulations.
- Use of phosphate free detergents specified in licence conditions where appropriate.
- Section included in new planning application guidance document requiring certain new developments to apply for discharge licences prior to construction.
- In the period July 2000 – 2002, 69 Section 12 and 25 Section 23 Notices issued and 14 prosecutions were initiated – most related to agricultural pollution.
- Survey of proprietary single house treatment systems carried out. Guidelines drafted on site suitability for septic tanks and treatment systems. Several Section 12 Notices issued to owners of malfunctioning septic tanks.
- Nutrient Management Planning imposed on some intensive agricultural activities.
- Council involved in catchment management projects for Mulkear and Maigue rivers, which are managed by Shannon Regional Fisheries Board.
- Success achieved in stopping point source discharges from farms in Balliana and Glosha subcatchments of River Maigue.
- Strong emphasis on farmer education and co-operation in Maigue and Mulkear catchments.
- Three Rivers Project and Council carried out survey of Aherlow River, nine problem farms to be investigated.
- Council involved in web-based AQUANET project with Co. Limerick VEC to raise awareness of water quality issues. Training of interested groups ongoing.
- Discussions held with Coillte in relation to pollution due to forestry.

Limerick City Council

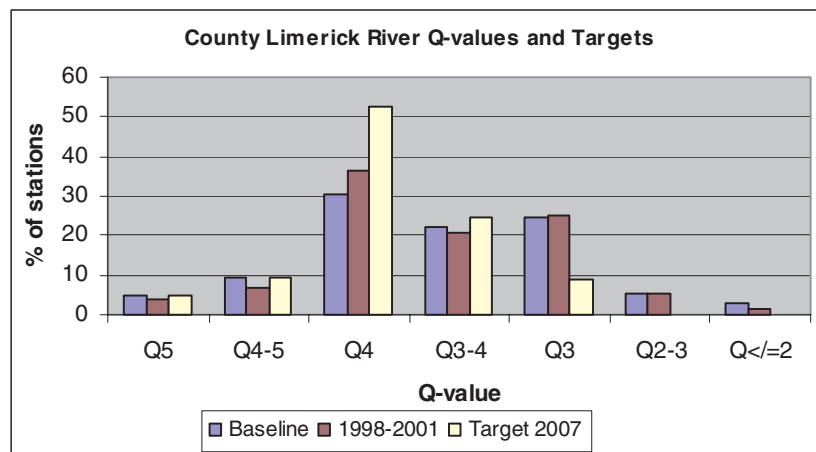
SUMMARY OF WATER QUALITY STATUS

- There are no EPA monitored river stations or lakes within the functional area of Limerick City.

PROGRESS IN MEASURES BEING IMPLEMENTED

- The Agency received a letter from the Council outlining the current monitoring programme.
- Phosphorus monitoring is carried out on the restaurants in the city.

(a)



(b)

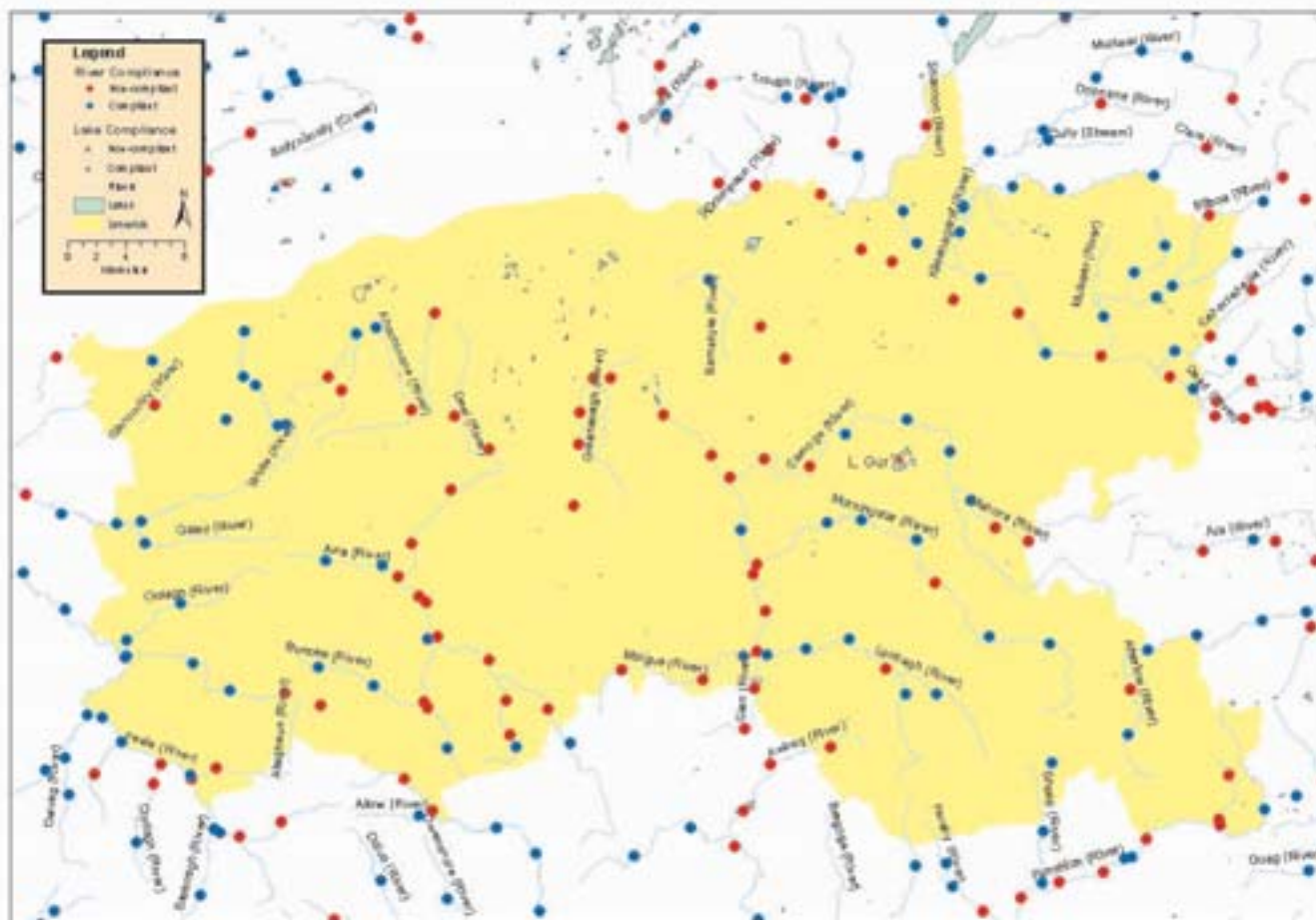


Figure 13(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Limerick

Longford County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in water quality in Longford with 48.6 per cent of stations currently of satisfactory quality compared to 37.8 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 45.9 per cent comply with the standards set in the Regulations, down 2.7 per cent from the last report.
- 45.9 per cent of stations meet the biological targets of the Regulations, down 2.7 per cent from the last report.
- There has been a decline in the number of high quality Q5 and Q4-5 stations, down from 3 in the baseline survey to 1 currently.
- There are 11 lakes in the county which fall under the Regulations, 7 of these were recently monitored and 3 of these were not compliant (Loughs Gowna (North), Gowna (South) and Kinale).

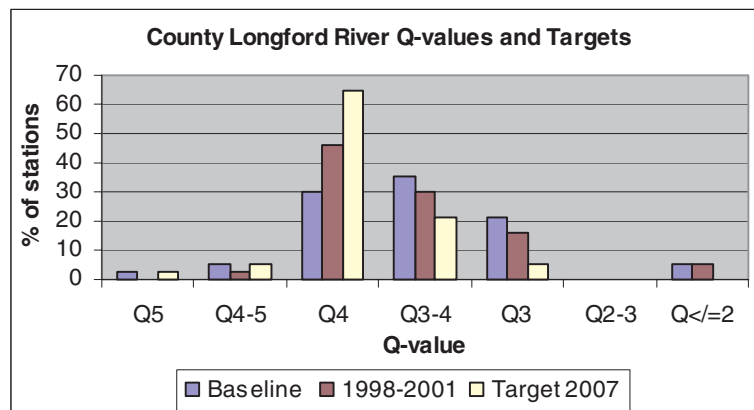
ADDITIONAL MEASURES PROPOSED

- Farm surveys in risk areas identified from Lough Derg/Ree study to commence in 2003 when two environmental technician posts are filled.
- Phosphorus reduction to be installed in Edgeworthstown and Granard WWTPs.
- Lanesboro WWTP is an old primary treatment plant - aim to pump effluent to proposed new WWTP at Ballyleague in Roscommon.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Draft agricultural bye-laws prepared.
- Bye-laws put before Strategic Policy Committee for Sanitary and Environment.
- Submissions on bye-laws invited from IFA and ICMSA and public meeting held with farming community.
- Newspaper advertisements to highlight water pollution risks from farming activities.
- REPS uptake promoted.
- Almost 400 Section 12 Notices issued annually to farmers in Lough Gowna catchment to control slurry spreading activities in winter months.
- Phosphorus reduction installed in Longford WWTP since 2000.
- Operation of Edgeworthstown WWTP reviewed to minimise shock loadings from industry.
- New extended aeration WWTP in Granard since early 2003.
- Monitoring of WWTPs ongoing.
- One industrial Section 16 licence reviewed and another being issued to alleviate pressure on Edgeworthstown and Drumlish WWTPs respectively.

(a)



(b)

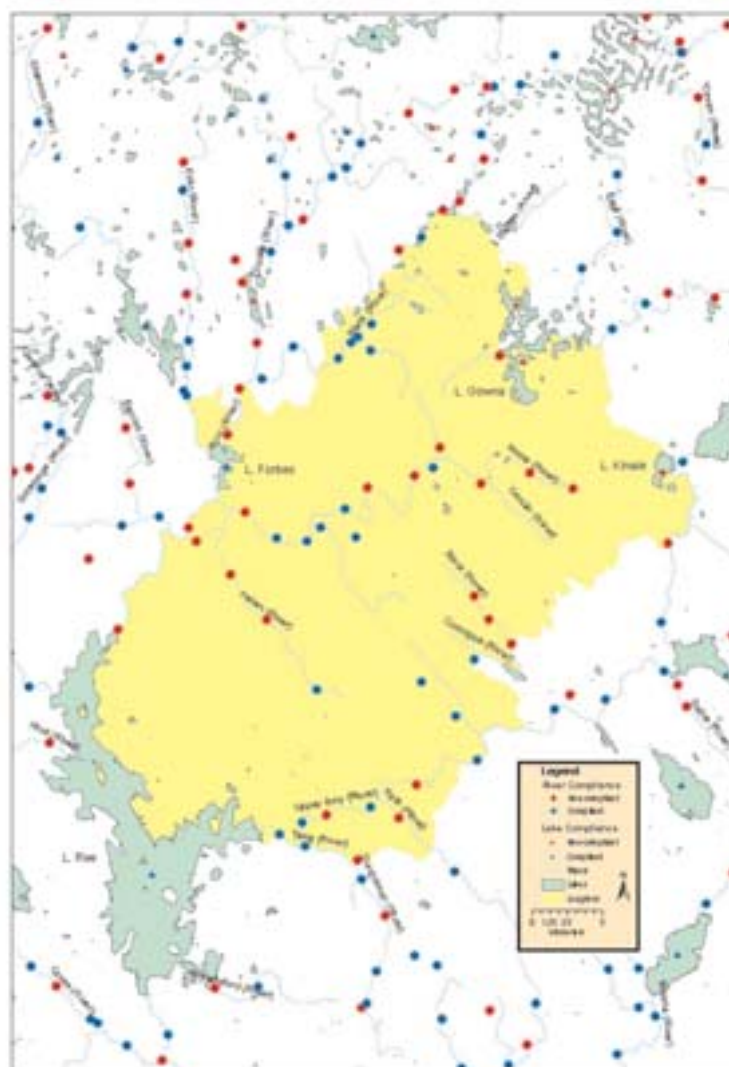


Figure 14(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Longford

Louth County Council

SUMMARY OF WATER QUALITY STATUS

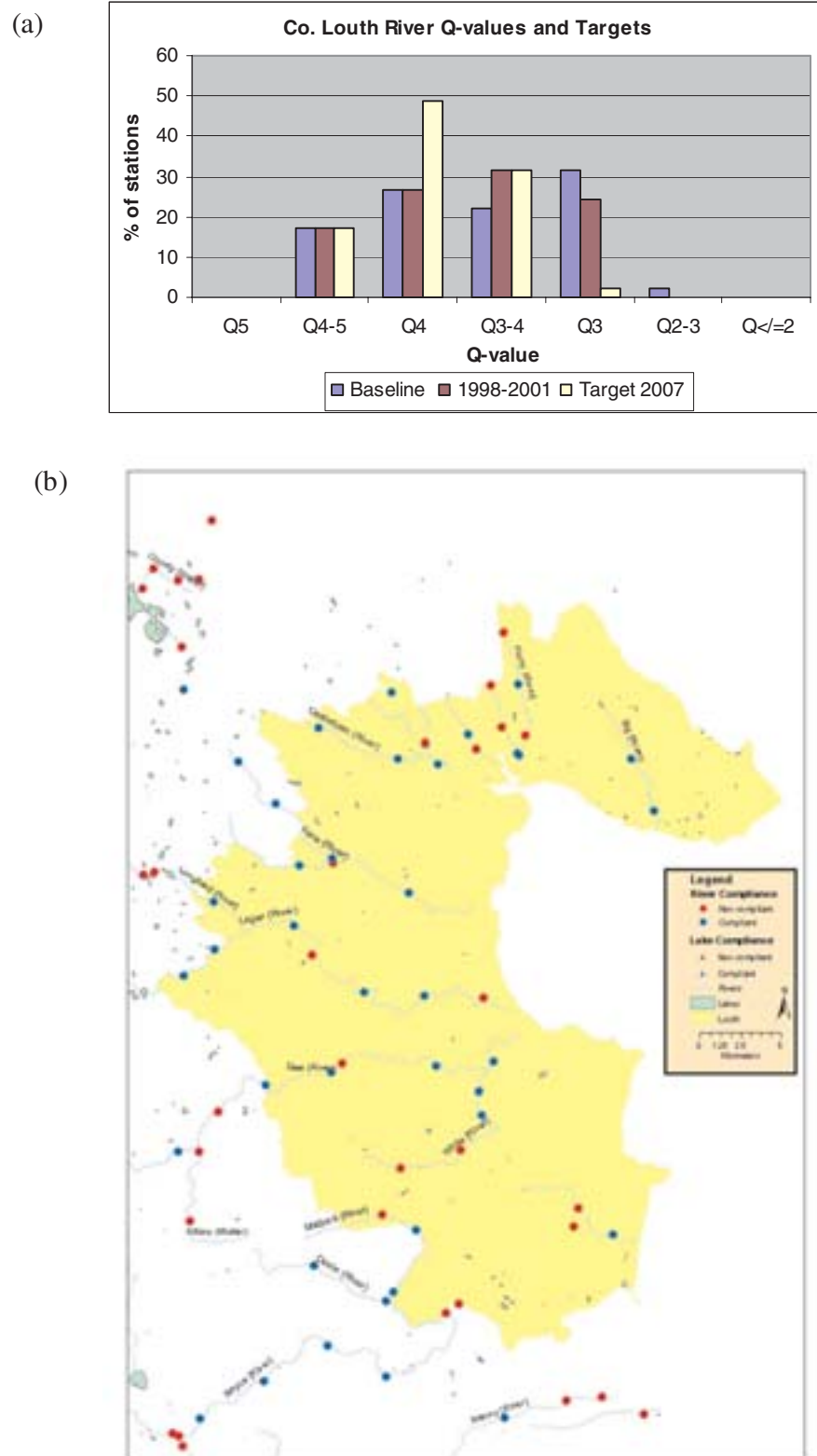
- Currently 43.9 per cent of stations are of satisfactory water quality, which is the same as that pertaining during the 1995-1997 baseline survey.
- Of stations monitored in 1998-2002, 65.1 per cent comply with the standards set in the Regulations, up 10.4 per cent from the last report, which is largely due to increased MRP monitoring, rather than improvements in water quality.
- 56.1 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- There has been a reduction in the number of moderately polluted stations, down from 14 in the baseline survey to 10 currently.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Phosphorus monitoring of rivers increased.
- Environment Section assesses planning applications that involve environmental emissions.
- Nutrient management planning required for planning applications that involve disposal of slurries/manure.
- Percolation trial hole observations and random testing for all domestic sewage/effluent disposal planning applications.
- Liaison with other local authorities through Three Rivers Project and Eastern RBM Project.
- Liaison with Teagasc including delivery of talks on water pollution.
- Random farm inspections and implementation of Water Pollution Act.
- Licence reviews commenced 2002.
- Limited farm surveys undertaken, programme of inspections developed. Section 12 notices issued.

ADDITIONAL MEASURES PROPOSED

- Increase flow monitoring of rivers.
- Prepare priority programme for further catchment surveys.
- Examine requirements for enhancing effluent treatment plant performance and seek funding by 2004.
- Develop improved educational and awareness programme.
- Establish database of trade effluent discharges.
- Establish GIS and Envisage to integrate information by 2004, pilot GIS for Ardee undertaken by Council at present.
- Prepare groundwater protection plan by 2004, report on Nitrate Vulnerable Zones being prepared.
- Leader programme with Teagasc being considered.
- Establish dedicated phosphorus team.



Mayo County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in water quality in Mayo with 78.5 per cent of stations currently of satisfactory quality compared to 73.6 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 72 per cent comply with the standards set in the Regulations, down 1.3 per cent from the last report, which is largely due to decreased MRP monitoring, rather than a decline in water quality.
- 72 per cent of stations meet the biological targets of the Regulations, up 0.9 per cent from the last report.
- However, there has been a decline in the number of high quality Q5 stations, down from 14 in the baseline survey to 9 currently.
- There has been a reduction in the number of moderately polluted stations, down from 33 in the baseline survey to 25 currently.
- There has also been a reduction in the number of seriously polluted stations, down from 4 in the baseline survey to 1 currently.
- There are 13 lakes in the county that fall under the Regulations, 11 of these were recently monitored and 2 of these were not compliant (Loughs Carra (North) and Knappaghbeg).

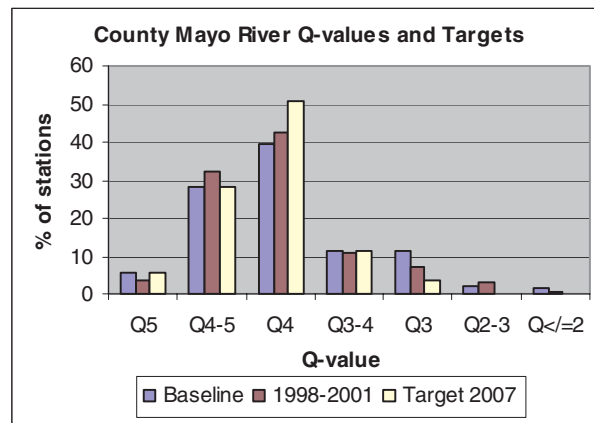
ADDITIONAL MEASURES PROPOSED

- Possible adoption of draft agricultural bye-laws.
- Possible adoption of draft forestry bye-laws.
- Possible use of nutrient management planning.
- Conduct more farm surveys and additional monitoring when resources become available.
- Extend Castlebar WWTP and complete Westport WWTP.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Involved in Western RBM Project.
- Environmental Education Officer appointed. Information pack on water quality issues circulated widely.
- Phosphorus removal installed at Ballinrobe, Ballyhaunis, Claremorris, Swinford and Castlebar WWTPs. Work ongoing at Crossmolina and Knock WWTPs.
- Secondary treatment provided at Irishtown, Turlough, Bonnicconlon and Belcara.
- Improvements to Newport landfill site and works underway at the Ballina site will result in leachate collection and treatment.
- All farmyards surveyed in Knappaghbeg Lake catchment, with enforcement under Water Pollution Act as necessary. Strict limits imposed on fish cage development in lake under Planning Acts.
- Catchment management plans for the Owenmore, Owenduff and Robe Rivers being drafted by Fisheries Boards and other relevant parties.
- Lough Conn and Lough Carra / Mask Committees periodically convened.
- Mayo Sludge Management Plan adopted.
- Pollution investigations ongoing.

(a)



(b)



Figure 16(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Mayo

Meath County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality in Meath with 18.6 per cent of stations currently of satisfactory quality compared to 20.6 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 37.4 per cent comply with the standards set in the Regulations, up 1.3 per cent from the last report, which is largely due to increased MRP monitoring, rather than an improvement in water quality.
- 33 per cent of stations meet the biological targets of the Regulations, down 3.1 per cent from the last report.
- However, there has been a reduction in the number of seriously polluted stations, down from 6 in the baseline survey to 2 currently.
- Lough Sheelin was classified in the baseline survey as being of eutrophic status. Current monitoring indicates that Lough Sheelin remains of unsatisfactory quality and thus requires improvement under the Regulations.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Since 1999 four new WWTPs commissioned at Navan, Carlanstown, Kildalkey and Kentstown.
- WWTPs upgraded include Enfield, Oldcastle, Duleek and Dunshaughlin, with P removal.
- Ashbourne and Ratoath sewerage networks connected to Fingal Drainage System.
- Since 1999, Meath has issued and followed up on 59 Section 12 Notices, issued 21 Section 4 and 2 Section 16 discharge licences, issued 2 Section 3 Notices and obtained one prosecution under Section 3.
- Section 12 Notices issued to owners of malfunctioning septic tank systems.
- All car wash discharges recently surveyed and licensed.
- Two Scientific Officers and an Environmental Technician work solely on implementation of Water Pollution Acts.
- Council monitor all discharge licences quarterly.
- Monitoring of effluent from all WWTPs and of receiving water upstream and downstream of plants.
- Use GIS system, Catchment Envisage, LabInfo and MapInfo.
- Promote participation in REPS and Best Farm Management Practices in co-operation with Teagasc.
- Basketstown landfill closed, new Knockanarley landfill EPA licensed.
- Planners take into account groundwater protection schemes.
- Council have audited twenty licences in last two years.
- Council controlling landspreading of waste through permitting.
- Council requesting 20 weeks slurry storage capacity.
- New laboratory set up at Farganstown.

ADDITIONAL MEASURES PROPOSED

- Council states that it will fully implement the River Tolka and Boyne Water Quality Management Plans.
- Calculate catchment nutrient budgets, evaluate if byelaws are necessary.
- Currently assessing use of reed beds to treat farm waste with Teagasc.
- Carry out farm surveys in hot spot areas and enforce Water Pollution Act where necessary.
- Promote and implement the use of nutrient management planning for individual farms where hot spots are identified.
- Council to investigate all quarries to evaluate if licence required under Water Pollution Acts.
- Expand role of environmental education officer to include water quality issues and to promote use of phosphorus-free detergents.
- Upgrade WWTPs including Athboy, Ballivor, Longwood, Summerhill, Moynalty, Kilmessan, Laytown/Julianstown and install sewerage network schemes at Stamullen and Castletown (Tara). Five plants to include P removal.
- Council intend to recoup treatment costs from licensees discharging to sewer.
- Updating monitoring of surface water quality, taking into account Three Rivers and EPA monitoring.
- Environment staff to be GIS trained.
- Council intend to determine and eliminate causes of pollution on particular river reaches.
- Employ two staff to implement Regulations full-time.
- Survey housing estates for misconnections of foul sewers to surface water drains.
- Review and update water abstraction register.
- Review all discharge licences over 5 years old in light of Regulations and target unlicensed discharges.
- Council aim to licence all industrial discharges within next four years.

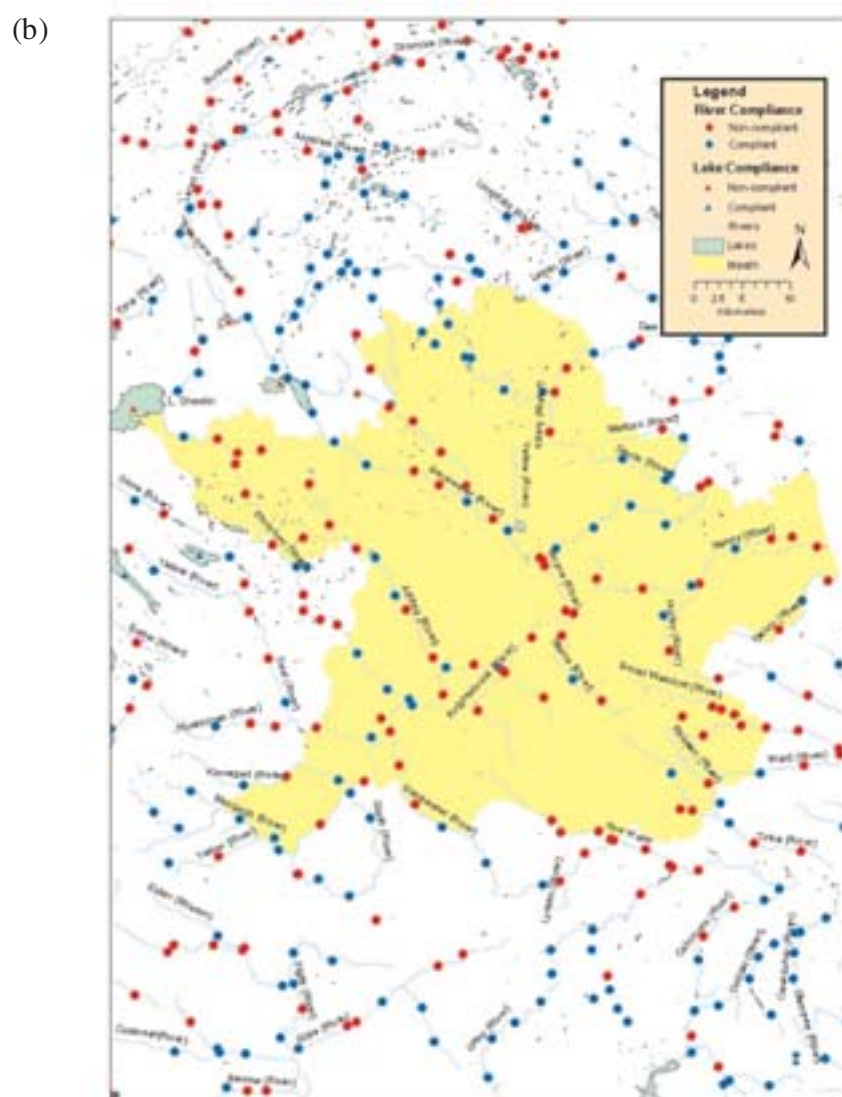
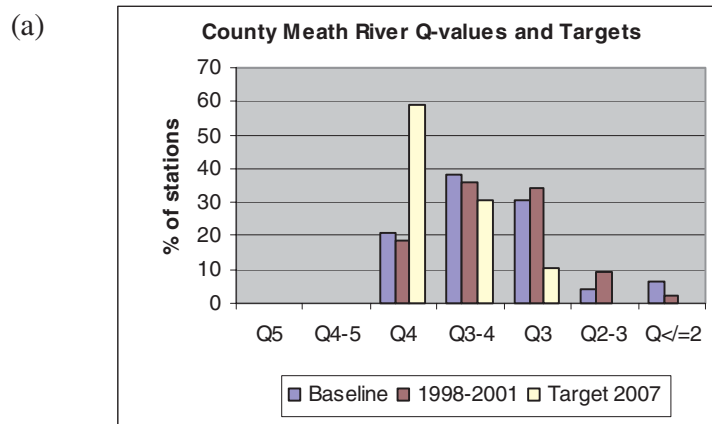


Figure 17(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Meath.

Monaghan County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight decline in water quality with 27.8 per cent of stations currently of satisfactory quality compared to 29.2 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 33.3 per cent comply with the standards set in the Regulations, down 21.6 per cent from the last report. This is largely due to decreased MRP monitoring, though there has been some decline in biological water quality as well.
- 31.9 per cent of stations meet the biological targets of the Regulations, down 4.3 per cent from the last report.
- The number of high quality Q5 and Q4-5 sites has declined from 12 in the baseline survey to 8 currently.
- However, there has been a reduction in the number of seriously polluted stations, down from 3 in the baseline survey to 1 currently.
- There are 47 lakes in the county that fall under the Regulations, however, the baseline status of most of these has not yet been confirmed. Of the four lakes that were assigned a baseline status in 1995-97, two are compliant with the Regulations (Loughs Annamakerrig and White) and two are not compliant (Loughs Eigish and Muckno).

ADDITIONAL MEASURES PROPOSED

- Optimise information on agricultural activities through use of GIS-project and in-house research.
- Carry out catchment surveys – initially concentrating on hot spot areas, polluted river stretches and unsatisfactory lakes.
- Additional monitoring of point discharges and liaison with Sanitary Services regarding improvements in WWTPs and collection systems.
- Establish Steering Committee involving sectors and develop educational and awareness programme.
- Environmental Awareness Officer to be appointed shortly.
- Groundwater Protection Scheme to be completed by GSI in September 2002.
- Establish liaison structures with neighbouring local authorities.
- Planning application forms to be reviewed to include environmental considerations by 2003.
- Investigate unlicensed discharges by Dec. 2003.
- WWTP work to include upgrade of Monaghan town collection system; extend Carrickmacross WWTP and upgrade collection system.
- Develop WWTP procedures manual.
- Hydrometric network to be upgraded by 2007.
- Expand farm and business surveys to other catchments.
- An extension under Article 3(9) of the regulations is being sought for the entire county for the maximum allowed period of 6 years.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Additional staff recruited to implement Regulations in 2001.
- Phosphorus Team of 4 members set up in February 2002.
- Enforcement of Water Pollution Act and Waste Management Act ongoing.
- Databases established on relevant attributes of agricultural enterprises, waste tracking system revised.
- Consultants have completed GIS mapping project and made recommendations on water quality monitoring and management.
- Council staff reviewing GIS project products and associated Envisage package for future use.
- Soil phosphorus data collected, runoff risk map prepared.
- Environment Section significantly extended and restructured.
- Environment Section examine planning applications.
- All active licensed premises inspected in 2002 and performance reviewed. 11 licences reviewed and 11 at draft review stage. One prosecution taken in 2001.
- Sludge management plan sent to DEHLG for approval. Implementation of Waste Management Plan ongoing.
- WWTPs installed/upgraded at Glaslough, Tydavnet.
- Automatic flow monitoring and sampling equipment installed at all WWTPs. All caretaker staff partaking in National Certificate in the Operation of WWTPs.
- Three laboratories involved in EPA intercalibration scheme.
- Planning control on urban development to prevent overloading of WWTPs. Planning contributions redirected to Sanitary Services budget.
- Investigations into problems with storm overflows and collection systems ongoing.
- Abstractions under review, new bore wells constructed at Clones and Monaghan town.
- Additional P monitoring in rivers and lakes.
- Intensive monitoring in Blackwater catchment.
- Some awareness raising of agricultural sector through newspaper notices, leaflets, Annual Environment Bulletin, advice to contractors etc.
- Improvements to landfill ongoing.
- Farm and business surveys ongoing in Maghera catchment. 123 premises visited. Four Section 12 notices issued. Fifty advisory letters issued. 24 reinspections of silage making facilities.

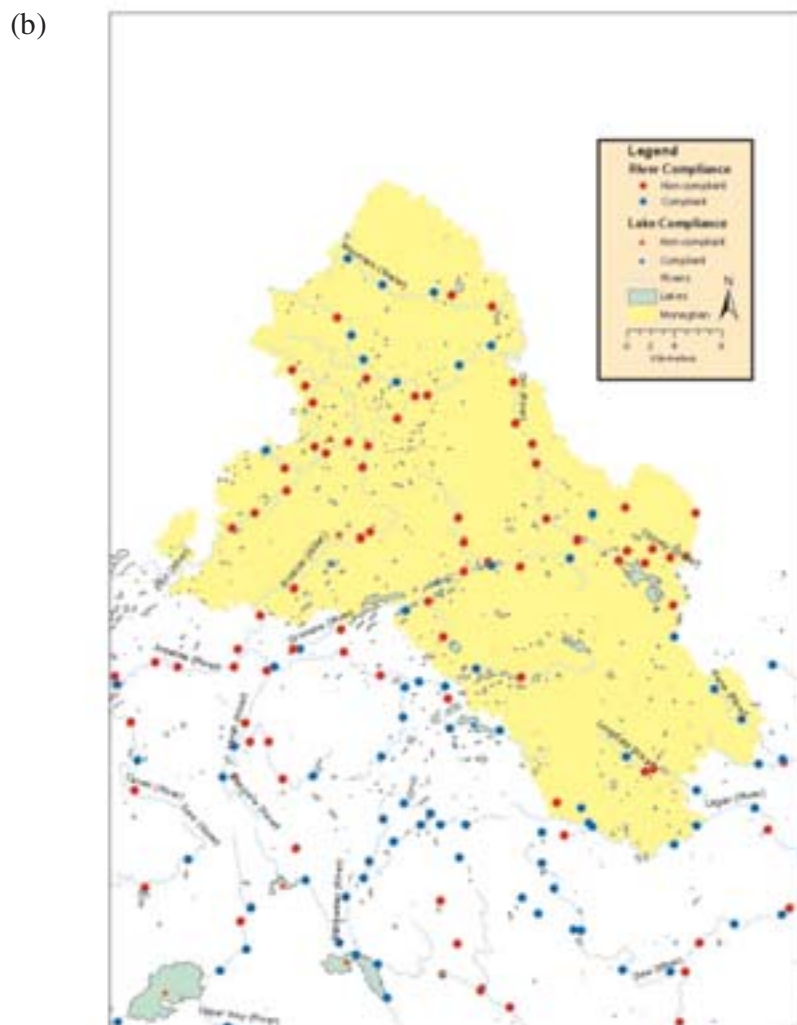
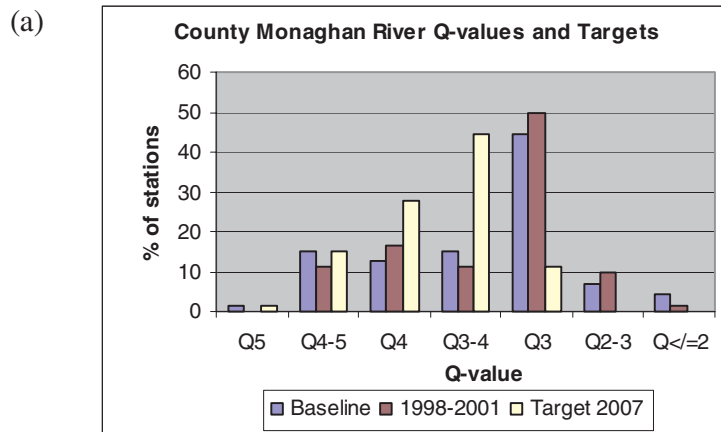


Figure 18(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Monaghan.

Offaly County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight improvement in water quality in County Offaly with 43.9 per cent of stations currently of satisfactory quality compared to 43.0 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 50.5 per cent comply with the standards set in the Regulations, down 4.7 per cent from the last report, which is due to a decrease in recent MRP monitoring, rather than a decline in water quality.
- 50.5 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- The number of high quality Q5 stations has declined from 4 in the baseline survey to 2 currently.
- However, there has been a reduction in the number of moderately and seriously polluted stations, down from 30 in the baseline survey to 26 currently.
- There is one lake, Pallas Lough, designated under the Regulations but there were no recent monitoring data of its status submitted.

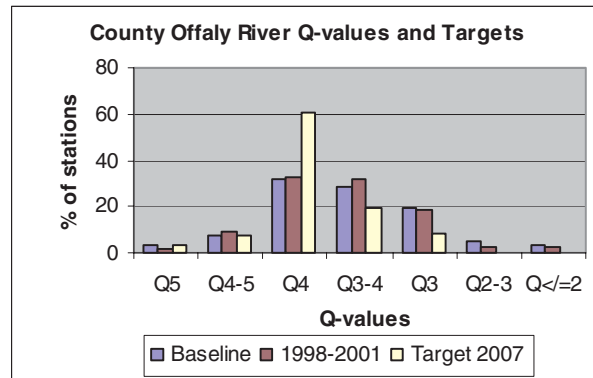
ADDITIONAL MEASURES PROPOSED

- County Offaly includes part of the Shannon, Eastern and South Eastern River Basin Districts, liaison with consultants on RBM projects initiated.
- WWTPs to be upgraded / constructed include Edenderry, Clara (both including P removal), Walsh Island, Ballinagar (both including constructed wetlands), Ferbane, Clonbollogue, Kinnity, Rhode, Clonaslee, Mucklagh and Rahan.
- Upgrading proposed for Tullamore WWTP including storm water holding facilities and 80,000 p.e. sludge treatment facility (anaerobic digestion). Satellite sludge acceptance centres to be at Edenderry, Birr and Ferbane.
- Address problems arising from peat producing industry – consultations ongoing.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Offaly County Council takes an active part in Lough Derg / Ree Catchment Monitoring and Management System.
- Member of Barrow Catchment Management Group.
- Member of Operational Management Group of Three Rivers Project that includes the Boyne.
- Improved operation of phosphorus removal facilities at Birr and Tullamore WWTPs .
- Significant industrial discharge to Birr WWTP identified and Section 16 discharge licence issued.
- Extended aeration WWTPs constructed at Coolderry, Shannon harbour and Bracknagh.
- Agricultural bye-laws adopted July 2001.
- 110 farm surveys carried out, primarily in bye-law areas.
- Two agricultural scientists and one environmental technician employed to carry out farm surveys and related investigations.
- One environmental technician employed for licensing duties under the Water Pollution Acts.
- Six new discharge licences issued and five reviewed since 2000. Survey of other potentially licensable activities carried out.
- Eighteen Section 12 Notices served on identified polluters, primarily in relation to agricultural activities. Two Section 18, two Section 55 and one Section 3 notice have been issued under the Waste Management Act 1996.
- Temporary Environmental Education Officer appointed.
- Senior engineering staff have engaged in presentations/workshops with farming community regarding bye-laws.
- Sludge management plan prepared by consultants
- Promotion of REPS and Farm Waste Management Scheme ongoing.

(a)



(b)

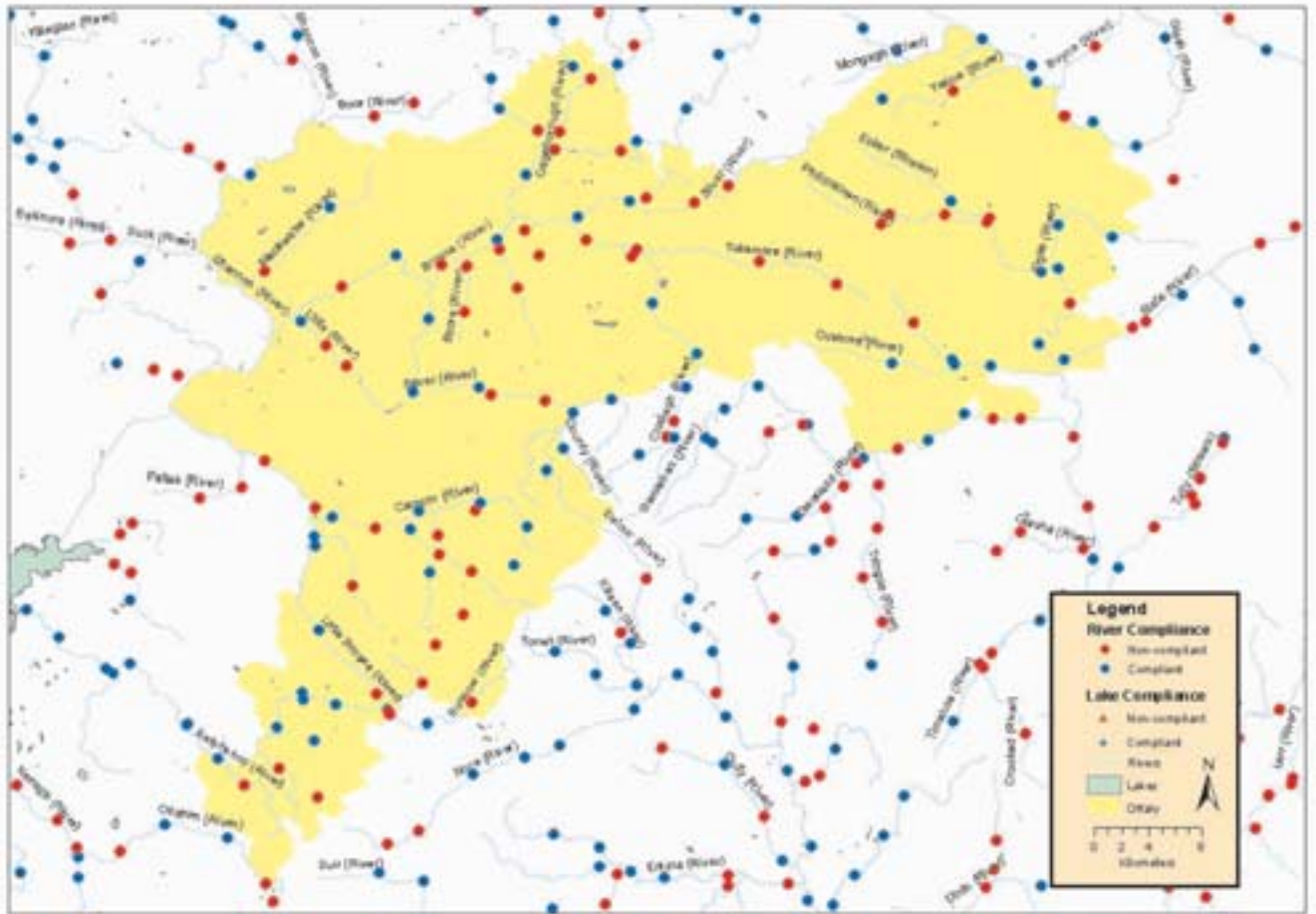


Figure 19(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in County Offaly.

Roscommon County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in water quality in County Roscommon with 60.2 per cent of stations currently of satisfactory quality compared to 55.3 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 69.4 per cent comply with the standards set in the Regulations, up 5.9 per cent from the last report, which is largely due to increased MRP monitoring.
- 63.4 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- The number of high quality Q5 and Q4-5 sites has increased from 12 in the baseline survey to 14 currently.
- In addition, there has been a reduction in the number of moderately polluted stations from 36 in the baseline survey to 24 currently.
- However, there has been an increase in the number of seriously polluted stations, up from 3 in the baseline survey to 5 currently.
- There are nine lakes in Roscommon assigned baseline status under the Regulations. All of these lakes are currently compliant, however, the improved water quality of Lough Ree may be due in part to infestation of the lake with the zebra mussel, as well as to improvement in wastewater treatment and other measures.

ADDITIONAL MEASURES PROPOSED

- Liaison with EPA on monitoring programme.
- Leachate collection and treatment at Roscommon landfill by 2003.
- Application to EPA for revised licence for Ballaghadereen landfill.
- Three major (Castlrea, Cortober and Ballyleague) and 18 smaller schemes to be developed.
- Plan for Environment Department to check planning applications that include septic tanks, extra staff to be recruited.
- Farm surveys to be extended to seven localised risk areas as identified by the Lough Derg/Ree Study.
- Laboratory to apply for ILAB accreditation for all core parameters.
- It is planned to hold meetings open to all farmers. Environmental Education Officer to focus on informing the public about environmental problems through leaflet drops, lectures and newspaper articles.
- In the Cloonfad catchment closer liaison with forestry interests proposed.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Involved in Lough Derg/Ree Water Quality Monitoring and Management System and the Western and Shannon RBDs.
- Draft Groundwater Protection Plan prepared by GSI.
- Connaught Waste Management Plan adopted.
- Sludge Management Plan adopted.
- Closer liaison between Planning and Environment Departments. Environmental personnel check all planning applications, apart from domestic dwellings, with potential environmental impact.
- Three Section 4 and three Section 16 discharge licences reviewed.
- Use of P free detergents stipulated in planning conditions for hotel.
- 8 large WWTPs and 9 small schemes completed under Water Services Programme 1999-2001. The large schemes included Monksland, Ballaghadereen, Roscommon, Boyle, Tarmonbarry (including boat pumping facilities), Cloonfad, Ballintubber and Ballinagar.
- Control of septic tanks through the planning system ongoing.
- Farm surveys have commenced, including 41 conducted in Cross River catchment and 47 in Cloonfad river catchment.
- Four reed beds completed for reducing phosphorus inputs from small scale urban agglomerations (Cloonfad, Arigna, Keadue and Ballyfaman).
- Liaison with EPA, other local authorities, Lough Derg/Ree Steering Committee.
- Talks at REPS conferences.
- Environmental Education Officer appointed.
- One staff member appointed to duties linked to Phosphorus Regulations.
- Monitoring of rivers, WWTPs and licensed discharges ongoing.
- Quality control programme in operation in laboratory.

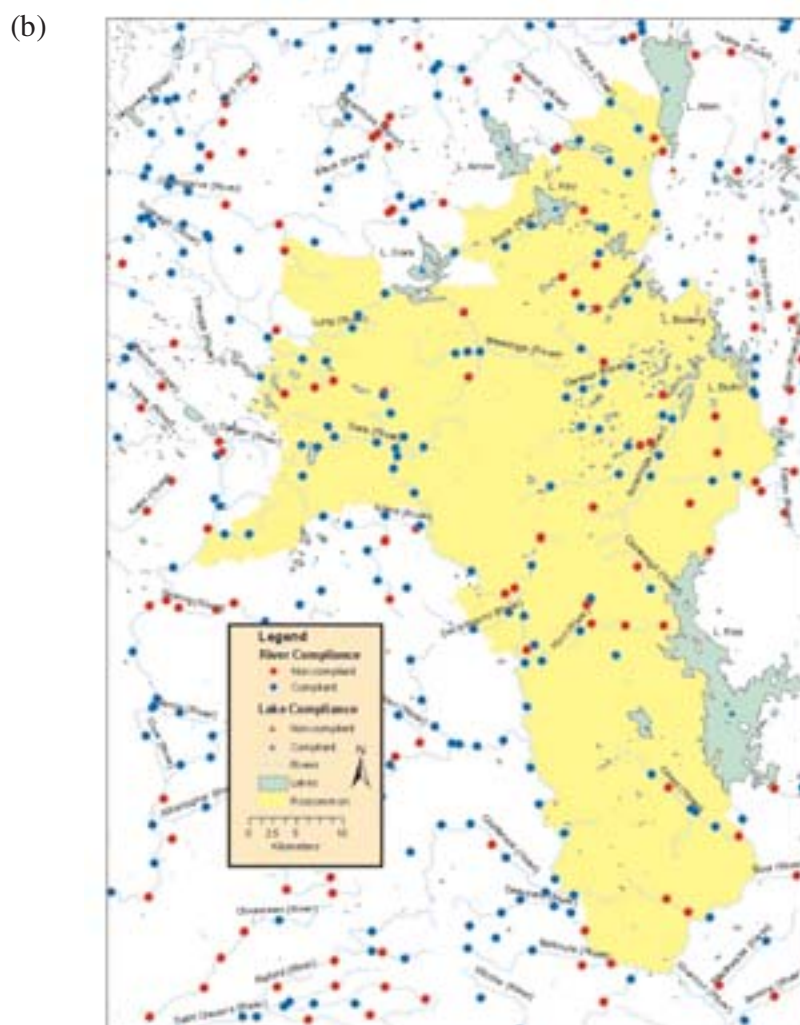
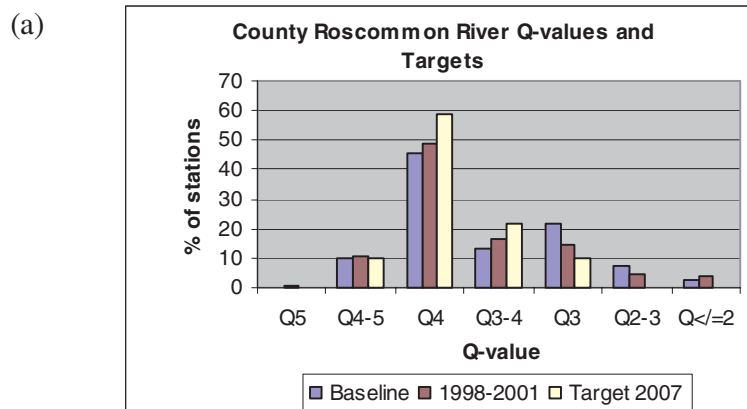


Figure 20(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in County Roscommon.

Sligo County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in water quality in County Sligo with 80.8 per cent of stations currently of satisfactory quality compared to 76.8 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 74.7 per cent comply with the standards set in the Regulations, down 3.6 per cent from the last report.
- 74.7 per cent of stations meet the biological targets of the Regulations, down 1.5 per cent from the last report.
- However, the number of high quality Q5 sites has increased substantially from 3 in the baseline survey to 9 currently.
- There are 5 lakes in the county that fall under the Regulations, 4 of these were recently monitored and all are compliant.

ADDITIONAL MEASURES PROPOSED

- Upgrade WWTPs at Aclare, Cloonacool, Tubbercurry, Gurteen, Culfadda, Ballymote, Ballincarrow and Collooney to include phosphorus removal.
- Secure Central Government finance for: capital works programmes; recruitment of staff; preparation of Groundwater Protection Plan; expansion of GIS; increased monitoring; farm surveys and ancillary costs.
- Planning policies to be drawn up for septic tanks, agriculture and forestry developments, bye-laws possible.
- Review all discharge licences by end of 2003.
- Establish multi-sectoral catchment management committees in the Owenmore and Moy River Catchments.
- Expand Lough Gill GIS to whole county.
- Carry out farm surveys and risk assessment in most catchments, particularly the Owenmore, Moy, Lough Arrow and Lough Gill catchments, to help assess need for nutrient management planning.
- In-depth study of nutrient run-off from two farms proposed.
- Nutrient management planning to be required on farms that receive pig slurry.
- Measures report submitted for Lough Gill.

PROGRESS IN MEASURES BEING IMPLEMENTED

- River/lake monitoring programme reviewed. Monitoring of Lough Arrow commenced Oct 2001. Monitoring programme developed for Lough Easkey and Lough Tait.
- Enforcement of Water Pollution and Waste Management legislation ongoing. 125 water pollution cases and 102 waste management cases investigated in 2000/01. All cases followed up with corrective action either taken voluntarily or as a result of legal means.
- Four discharge licences dealt with during 2001.
- Waste Management Plan for Connaught region adopted by all relevant local authorities in 2001.
- Sludge Management Plan prepared and submitted to DEHLG for approval.
- Three additional staff recruited in 2000.
- All septic tanks (150) within quarter mile of Lough Arrow surveyed in 2001/02. Survey commenced around Lough Gill.
- Environmental Services co-ordinator gives talks to local community groups and schools. Communication Officer carries out publicity campaigns on radio, newspapers etc. Council website has information on phosphorus.
- Environmental education leaflet produced for agricultural sector and presentations given to REPS participants.
- New laboratory equipment purchased for nutrient analysis; improved quality control / assurance measures continuing.
- Phosphorus removal provided at Geevagh, Monasteraden and Curry WWTPs.
- 113 farm surveys and 150 septic tank surveys carried out in Lough Arrow catchment.
- Technical committees established for Lough Gill (May 2002) and Lough Arrow (Nov. 2001) catchments.
- Liaison with Forestry Service to streamline consultation process regarding forestry applications.
- Environment staff consider all forestry developments in sensitive catchments. Indicative Forest Strategy for Sligo under preparation with Environment staff input.
- Detailed river surveys carried out on a number of rivers to identify pollution sources including Ballymole Stream, Doonowney River, Gurteen Stream, Tubbercurry Stream, Leaffony River and Mullaghanoe River.

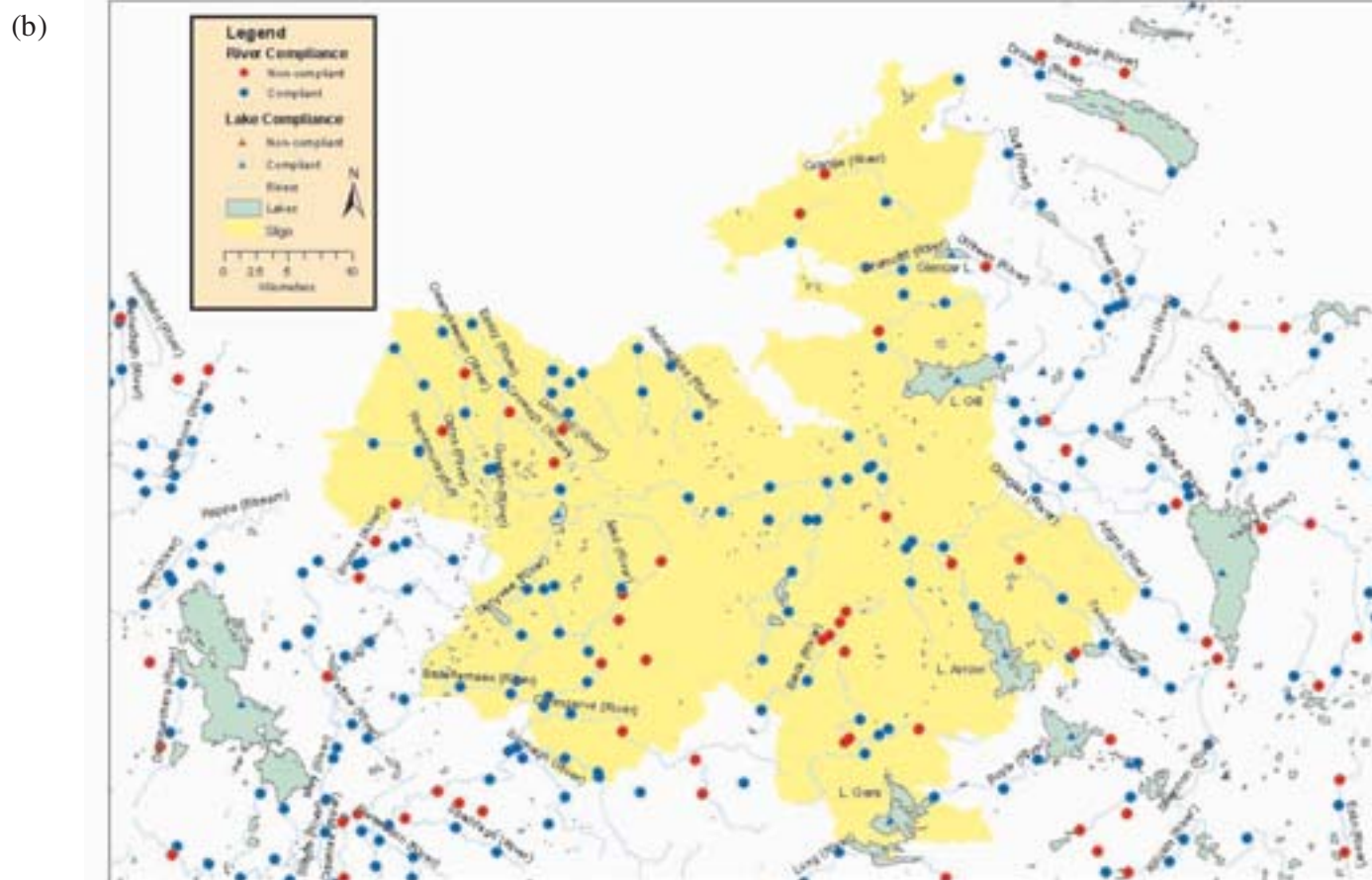
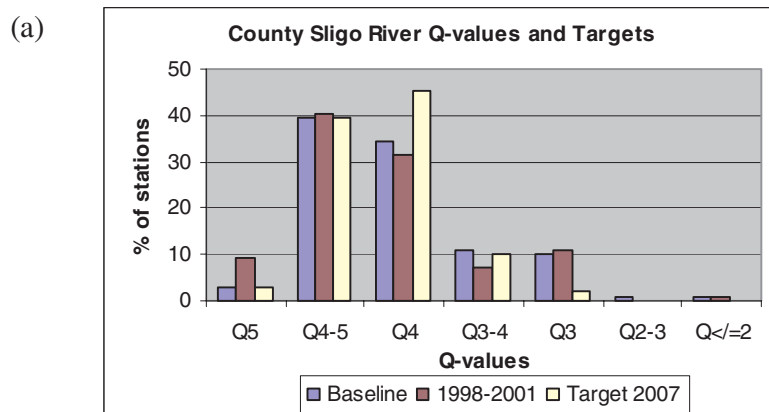


Figure 21(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in County Sligo.

North Tipperary County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in water quality with 50.0 per cent of stations currently of satisfactory quality compared to 38.2 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 61.8 per cent comply with the standards set in the Regulations, up 0.9 per cent from the last report.
- 57.3 per cent of stations meet the biological targets of the Regulations, down 0.9 per cent from the last report.
- The number of high quality Q5 stations has decreased from 5 in the baseline survey to 2 currently. However the number of Q4-5 stations has increased substantially from 9 in the baseline survey to 19 currently.
- In addition, the number of moderately polluted stations has been reduced from 32 in the baseline survey to 20 currently.
- Current monitoring indicates that Lough Derg has improved in trophic status and is now of (satisfactory) mesotrophic status, therefore meeting the target of the Regulations. However, this apparent improvement may be partly due to infestation of the lake with the zebra mussel, as well as to improvements in wastewater treatment and other measures.

ADDITIONAL MEASURES PROPOSED

- Employ technician to carry out farm surveys.
- Terryglass sewerage scheme planned.
- Funding sought for upgrading of smaller WWTPs that do not qualify for EU Cohesion funds.
- Improved flow and chemical monitoring of WWTPs.
- Improved P removal efficiency at WWTPs.
- Brochure to be prepared on bye-laws in 2003.
- Purchase Automatic BOD analyser and increase phosphorus monitoring of surface waters.
- Review of Section 16 discharge licences to commence in 2003.
- School environmental education programme planned.
- Impact of forestry to be investigated.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Staff appointed to implement agricultural bye-laws, carry out farm inspections, review and audit farm management plans and promote good agricultural practice. Section 12 and 23 Notices issued where necessary.
- Templemore, Thurles and Borrisoleigh WWTPs to be upgraded.
- Flow measurement being installed in WWTPs. Phosphorus monitoring upstream and downstream of plants being carried out.
- Regular meeting established between Water Services and Environment Section.
- Nenagh Sewerage Scheme Stage 2 currently in progress, when completed will reduce overflows to Clarendon Stream.
- Phosphorus removal installed in Nenagh, Roscrea and Ballina WWTPs – special study underway on percolation filters.
- Review of Section 4 discharge licences commenced in 2002 and all discharge licences issued since 2000 have phosphorus limits attached.
- River channel surveys completed on the Drish, Clover and Suir downstream of Thurles, highlighting pollution sources and where remedial measures required.
- Investigations being made into impact of Lisheen Mines IPC facility on River Drish.
- Draft Sludge Management Plan prepared and under consideration.
- Draft Groundwater Protection Plan prepared by GSI.
- Council is involved in committees on Shannon and South-East River Basin Management Projects and on the Mulkear Catchment Management Group.
- Council inspects aerial fertilisation of forestry plantations.
- Agricultural bye-laws, introduced on 1 Jan 2001, include mandatory nutrient management planning and slurry storage capacities for specified areas.
- Council have employed Environmental Scientist and Agricultural Scientist to implement bye-laws, which regulate approximately 700 farmers farming 40,000ha.
- Involved in Inter-county Bye-law implementation group.
- Since 2000, 734 farm surveys completed and 52 Section 12 and Section 23 Notices issued.
- 116 farm surveys undertaken in the Nore catchment with 39 being revisited to determine if Section 12 Notices required.
- Envisage, a Computerized Information System, which comprises a series of databases linked to a GIS, has been installed – more user friendly Lab Info and Farm Survey Programmes to be developed.
- Global Positioning System units obtained.
- Environmental Awareness Officer appointed in 2000.
- Environmental newsletter published every three months.
- Public awareness campaign regarding bye-laws in newspapers, radio, leaflets, IFA meetings, Teagasc newsletters etc.
- Laboratory auto-analyser purchased.
- REPS promotion ongoing.

South Tipperary County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been no change in water quality in South Tipperary with 60.9 per cent of stations satisfactory quality in both the current and baseline surveys.
- Of stations monitored in 1998-2002, 60.9 per cent comply with the standards set in the Regulations, up 2.6 per cent from the last report.
- 57.4 per cent of stations meet the biological targets of the Regulations, up 0.9 per cent from the last report.
- However, there has been an increase in the number of seriously polluted stations from 1 in the baseline survey to 4 currently.

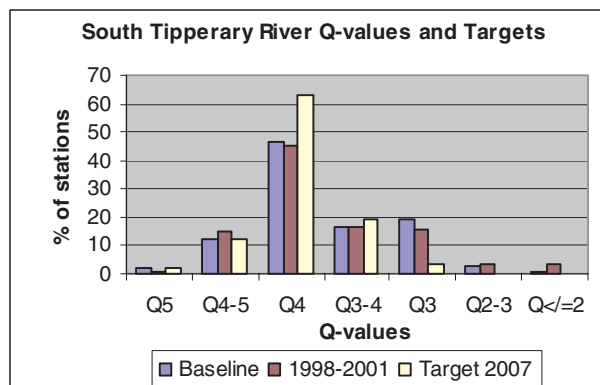
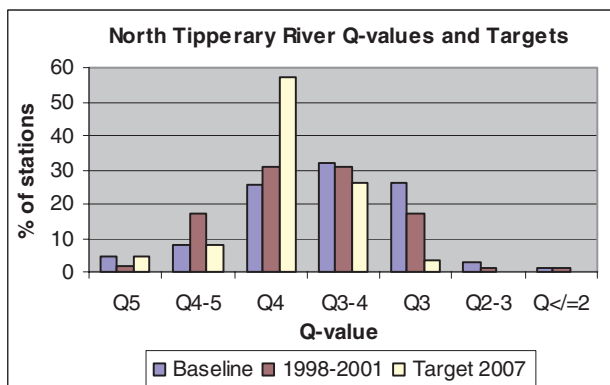
ADDITIONAL MEASURES PROPOSED

- Three Rivers Project for River Suir will form basis for Council implementation of Regulations throughout entire county.
- Upgrade twelve WWTPs under Grouped Operation Scheme by 2005, to include nutrient removal (Tipperary completed).
- In addition upgrade WWTPs at Limerick Junction and Mullinahone; and construct plants at Bansha, Holyford, Cullen and Clonoulty.
- Install constructed wetland at Cappawhite.
- Undertake river channel surveys.
- Implement Council Environmental Management System in Planning and Environment Section.
- Develop programmes for public / sectoral awareness.
- Establish Management Structure including local authorities and all major stakeholders.
- Establish soil phosphorus levels.
- Assess need for agricultural bye-laws.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Local Authority is implementing on an ongoing basis its Groundwater Protection Plan; Sludge Management Plan and Waste Management Plan.
- GIS being used for water quality management. Catchment Envisage developed by Three Rivers Project used to manage pressures/risk characteristics, monitoring data, farm surveys and nutrient management planning.
- Three Environmental Technicians recruited, being deployed in farm surveys, GIS application and laboratory analysis.
- 136 farm surveys and 48 pollution investigations carried out since July 2000.
- Council has issued 22 discharge licences since July 2000, 12 new and 10 after review. There are now 17 Section 4 and 43 Section 16 licences. Five Section 4 and four Section 16 licences are under review.
- Tipperary Co-operative Creamery now connected to main drainage system.
- Tipperary WWTP now with phosphorus removal installed. Process technician appointed in 2001.
- Enforcement of Water Pollution Act ongoing, issue of 37 warning letters under Section 3, 17 Section 12 notices – majority requiring Nutrient Management Planning, and 48 requests for further information under Section 23. EPA prosecution successful against major polluter.
- Good co-operation between Coillte, Council and Fisheries Board on aerial fertilisation.
- Implementation of Nutrient Management Planning and Best Farm Management Practices.
- Regulation of septic tanks through planning system.
- Survey of sheep dipping stations ongoing.
- Review of all quarry and mining operations ongoing.
- Review of landspreading ongoing, particularly piggery, mushroom and poultry developments.
- National Water Pricing Framework policy being implemented.
- Annual Water Quality Technical Review meeting held with relevant bodies.
- Public Awareness Officer recruited in 2001.
- Much publicity obtained through Three Rivers Project.
- REPS promotion ongoing.
- Three Rivers monitoring including intensive monitoring or River Ara catchment ongoing.
- Flow proportionate composite sampling of licensees. 16 hydrometric stations installed.
- Autosamplers installed in all WWTPs with PE>2000 and in six major subcatchments.
- Upgrading of laboratory facilities and data management.

(a)



(b)

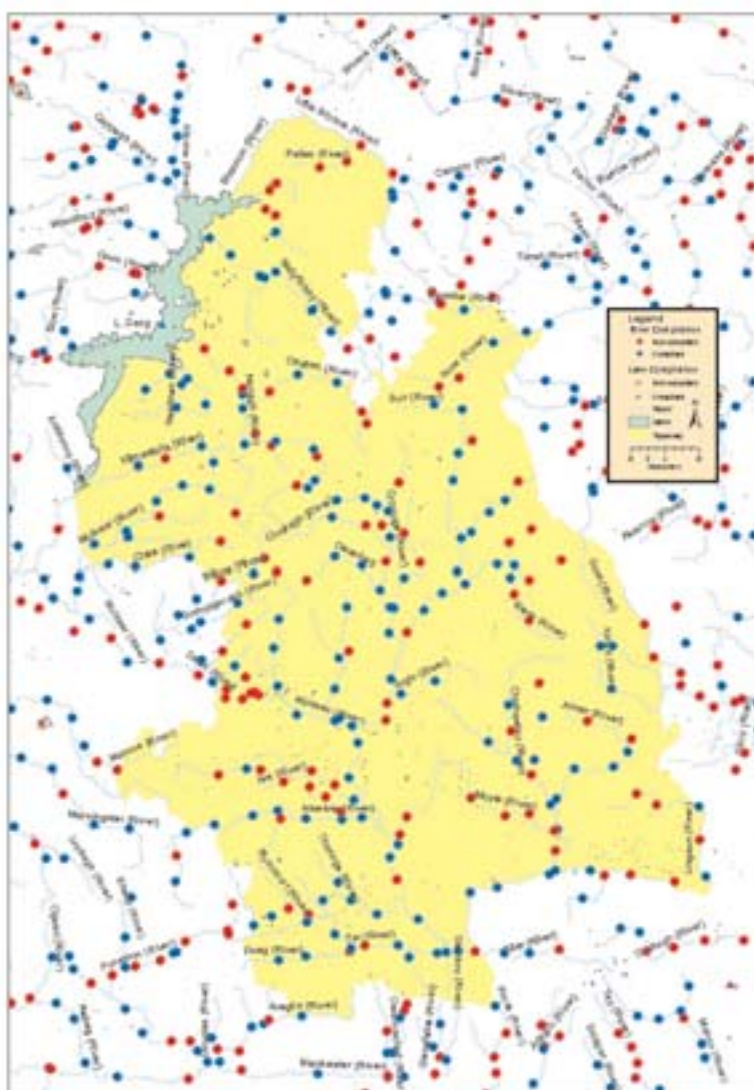


Figure 22(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in Tipperary

Waterford County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality in County Waterford with 68.9 per cent of stations currently of satisfactory quality compared to 75.7 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 51.4 per cent comply with the standards set in the Regulations, down 2.7 per cent from the last report.
- 47.3 per cent of stations meet the biological targets of the Regulations, down 4.1 per cent from the last report.
- The number of high quality Q5 sites has decreased from 2 in the baseline survey to 0 currently. The number of Q4-5 stations has decreased from 25 in the baseline survey to 11 currently.
- There are 13 lakes in the county that fall under the Regulations, 5 of these were recently monitored and 2 are not compliant (Loughs Ballyshonnock and Carrigantry).

ADDITIONAL MEASURES PROPOSED

- Implement water quality management planning, including groundwater protection scheme.
- Upgrade WWTPs at Dungarvan, Tramore, Stradbally, Tallow, Ardmore, Cappoquin, Dunmore East, Kilmacthomas, Villierstown, Aglish, Kilmeaden/Ballyduff and Clashmore.
- Constructed wetland being considered for Piltown.

PROGRESS IN MEASURES BEING IMPLEMENTED

- County-wide sludge management plan compiled in 2002.
- New septic tank discharges controlled by planning measures.
- Chemical and biological monitoring programmes reviewed and enhanced, in conjunction with EPA. Autosamplers installed in Ballyshonnock catchment.
- Technician recruited to water quality laboratory.
- Issue and review of Section 4 and Section 16 licences in light of Regulations. Eight out of 23 licences reviewed, to be completed in 2003.
- Farm visits and enforcement of Water Pollution Act, issue of advice, warnings, and Section 3, 10, 12 and 13 notices as required. Since 1998, 97 pollution investigations undertaken, twelve Section 12 notices issued and two prosecutions taken.
- Monitoring of WWTPs and receiving waters in light of Regulations.
- Liaison with other stakeholders, particularly through the Three Rivers Project, and South Eastern and Southern River Basin Management Projects.
- Intensive monitoring in Ballyshonnock catchment special study area, including promotion of best farm management plans. Twelve farms surveyed, eight plans developed (+4 REPS farms).
- Collaboration with Dúchas in trials on constructed wetlands for treating farm soiled water and sewage in the Dunhill River catchment special study area. Twelve wetlands granted planning permission, monitoring ongoing.
- Delivery of Envisage GIS package.
- Appointment of environmental awareness officer, publications in newspapers, school programmes, presentations at seminars.

Waterford City Council

SUMMARY OF WATER QUALITY STATUS

- There are no EPA monitored river stations or lakes within the functional area of Waterford City that currently come under the Regulations.
- However, Waterford City provide data from stations on the St John's River and the River Suir.

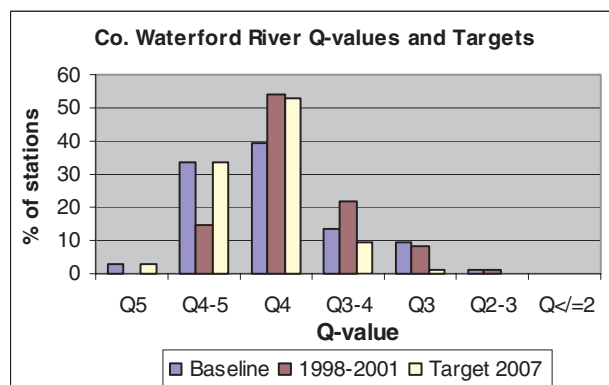
PROGRESS IN MEASURES BEING IMPLEMENTED

- Nine outfalls determined as major sources of pollution to St John's River in 2000.
- Four discharge licences reviewed and phosphorus inputs reduced. Drainage improvements have reduced phosphorus inputs from a fifth outfall.
- Notices have been served on industries discharging unauthorised substances into stream/river.
- Work ongoing to separate foul drains from surface water system along Scotch Quay, Hillview Housing Estate and the IDA Industrial Estates. Section 12 Notices issued where appropriate.
- Municipal landfill leachate management plan being implemented.
- Cleaning of St John's river and banks of illegally dumped material and excessive growth ongoing.
- Litter awareness campaigns in schools and housing estates ongoing.

ADDITIONAL MEASURES PROPOSED

- Review all Section 4 licences and enforce Water Pollution Act.
- Form alliance with business and residential sectors with regard to eliminating unauthorised connections and dumping to surface drains, some progress made.
- Form alliance with Teagasc and local farmers with regard to agricultural pollution.
- Designate areas where nutrient management planning required.
- Educate all parties bounding the river / stream about negative effects of dumping.
- Develop schools education programme.
- Establish phosphorus loads from proposed WWTP by 2005.
- Installation of nutrient removal facility at the proposed WWTP by 2007, if required.
- Close present landfill at Kilbarry by 2007, stabilise quantity and quality of leachate effluent and establish phosphorus loads from landfill. Waste licence applied for from EPA.

(a)



(b)

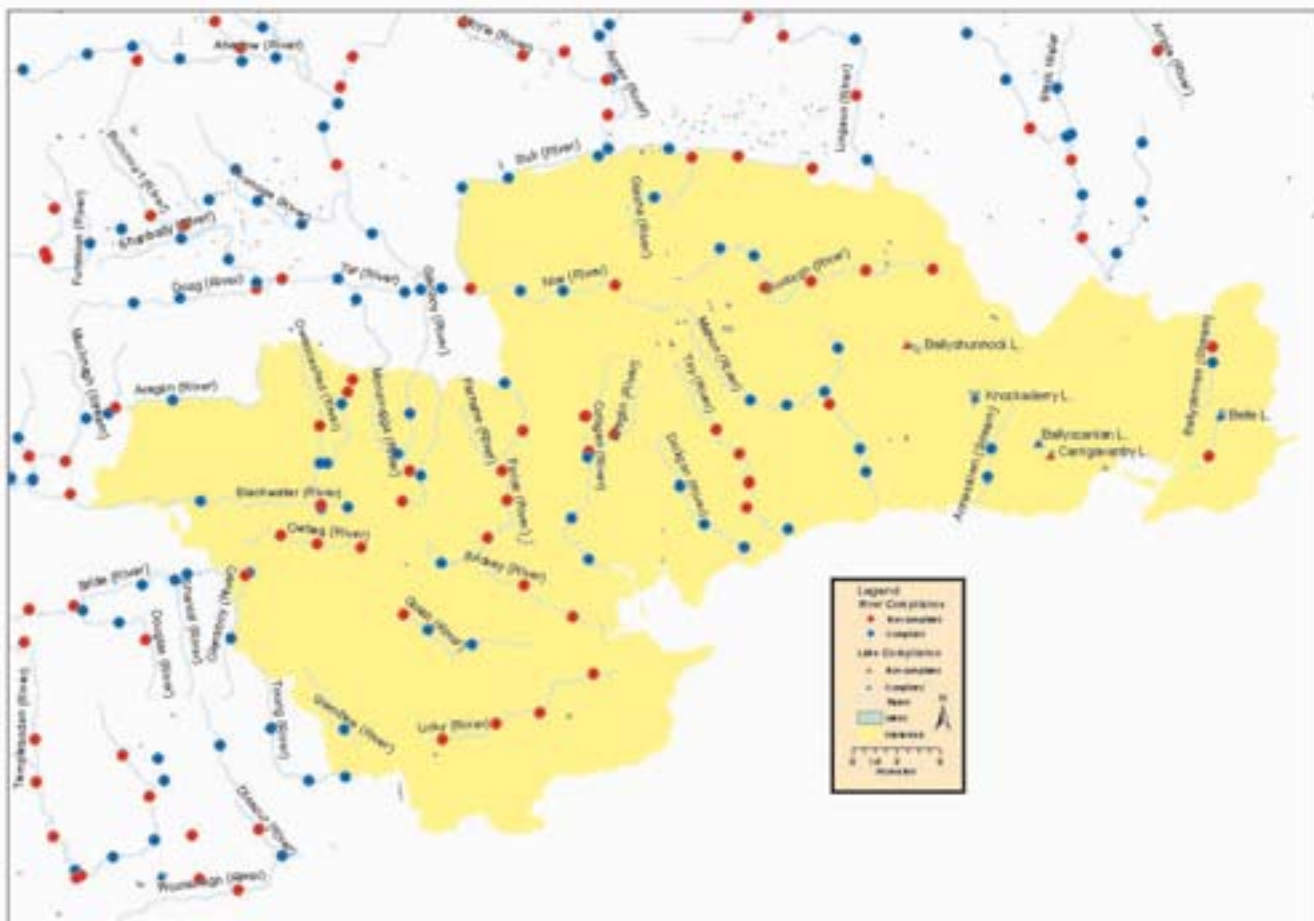


Figure 23(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in Waterford.

Westmeath County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in water quality in County Westmeath with 35.4 per cent of stations currently of satisfactory quality compared to 26.2 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 64.6 per cent comply with the standards set in the Regulations, up 18.5 per cent from the last report, though this is largely due to increased MRP monitoring.
- 44.6 per cent of stations meet the biological targets of the Regulations, the same as in the last report.
- The number of high quality Q4-5 stations has decreased from 4 in the baseline survey to 1 currently.
- However, the number of seriously polluted stations has decreased from 4 in the baseline survey to 0 currently.
- There are 12 lakes in the county that fall under the Regulations, 9 of these were recently monitored and 1 is not compliant (Lough Sheelin). Lough Ree is now of mesotrophic status and thus meets the target of the Regulations. However, this apparent improvement may be largely due to infestation of the lake with the zebra mussel, as well as to improvements in wastewater treatment and other measures.

ADDITIONAL MEASURES PROPOSED

- Co-ordinate council river and lake monitoring programme with EPA monitoring.
- Sludge Management Plan under preparation.
- Funding sought to ensure that wastewater treatment plants comply with the requirements of the EU Urban Waste Water Treatment Directive and to improve water quality.
- Install pump-out facilities along Lough Ree and River Shannon.
- Assess Mullingar sewerage system by July 2002. Report prepared for Kilbeggan and Athlone sewerage systems.
- Install phosphorus reduction at Kinnegad WWTP by end of 2002 and at Castlepollard WWTP before 2005. Sewerage treatment planned for Glasson.
- Upgrade Collinstown, Delvin, Clonmellon, Killucan, Ballinacarrigy, Ballymore and Tyrellspass WWTPs.
- Improvements to Marlinstown Landfill under way as part of closure procedures.
- Farm surveys in Gageborough catchment.
- Assess environmental risks from piggeries in Gaine catchment.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Council public awareness activities include public meetings on bye-laws; presentations with Teagasc on REPS; information leaflets on Council website; and issue of Council newsletter which deals with water quality issues.
- Council involved in Shannon and Eastern RBM projects; Lough Ree / Derg Catchment Monitoring and Management System (Shannon) and Three Rivers Project (Boyne).
- Agricultural bye-laws introduced on 1 March 2001 which include requirements for slurry storage and spreading, nutrient management planning and burial of fallen animals.
- Numerous farm surveys carried out in conjunction with bye-laws and 65 Section 12 Notices issued from Jan 2001 to June 2002, some of which have led to court proceedings. Five Section 3 Notices issued over same period.
- Council have established Agricultural Bye-laws workshop for local authorities to discuss bye-law implementation.
- The Council have 18 discharge licences to water, 11 of which have been reviewed or recently issued and 20 discharge licences to sewer, four of which have been reviewed, and one closed. All licences over three years old are under review.
- A monitoring programme has been established to assess degree of compliance with licences.
- Council have set treatment standards for single house wastewater treatment systems that are in close proximity to watercourses or sensitive areas.
- Liaison with other local authorities and peat extractors ongoing.
- Pollution investigations ongoing.
- Multyfarnham sewerage works upgraded. Improvements noted following upgrade of Moate WWTP.

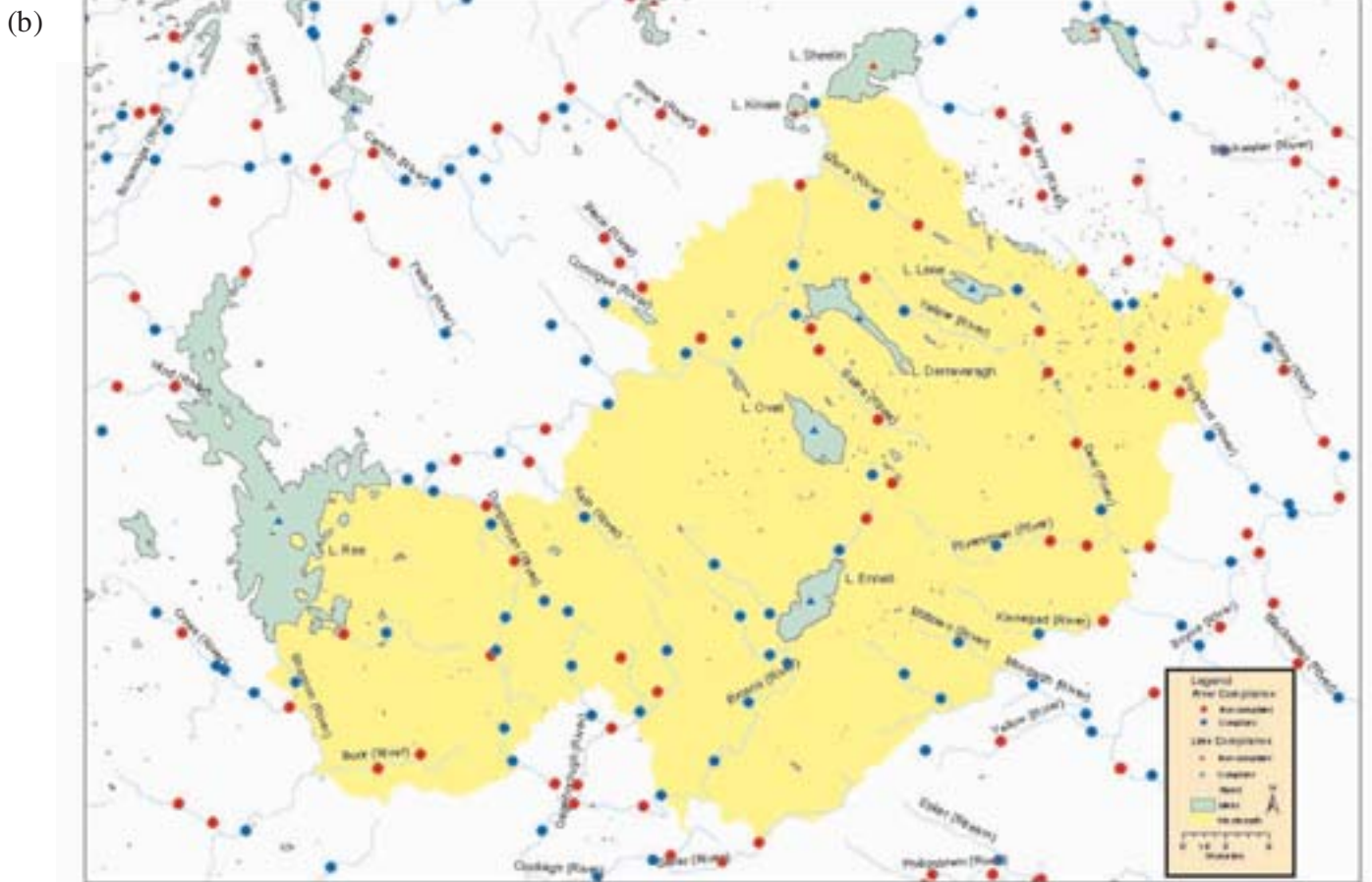
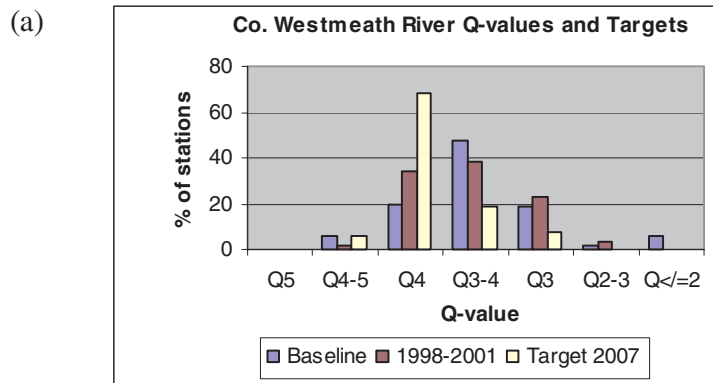


Figure 24(a) Trends in biological water quality; (b) River and lake compliance with Phosphorus Regulations in Westmeath.

Wexford County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in water quality in County Wexford with 50.0 per cent of stations currently of satisfactory quality compared to 40.9 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 55.9 per cent comply with the standards set in the Regulations, up 0.4 per cent from the last report.
- 53.6 per cent of stations meet the biological targets of the Regulations, up 0.4 per cent from the last report.
- The number of high quality Q5 stations has increased from 0 in the baseline survey to 2 currently.
- In addition, the number of moderately and seriously polluted stations has decreased from 34 in the baseline survey to 26 currently.

ADDITIONAL MEASURES PROPOSED

- Audit Section 4 discharge licences.
- Technician to be employed to carry out compliance monitoring of WWTPs, Blue Flag beaches and environmental complaints.
- Identify industries that require discharge licences.
- Obtain phosphorus monitoring results from licensees.
- GSI appointed to develop Groundwater Protection Scheme.

PROGRESS IN MEASURES BEING IMPLEMENTED

- Two technicians employed to assess all planning applications for septic tanks, wastewater treatment for housing developments, commercial property and agriculture. Suitability of ground conditions is major consideration.
- Priority list of WWTPs to be upgraded compiled.
- All 49 existing licences to discharge trade effluent to waters have been reviewed.
- Phosphorus discharge limits and monitoring included in licence conditions.
- 57 farm visits carried out, with 7 Section 12 and 7 Section 23 Notices issued since July 2000.
- Complaints database established.
- Council is part of South East River Basin Management System project.
- Liaison with other local authorities ongoing.
- Presentations made to Council Environment Strategic Policy Committee and REPS farmers.
- Council and Coastwatch Ireland ran awareness raising campaign in relation to wetlands.
- GIS officer appointed.

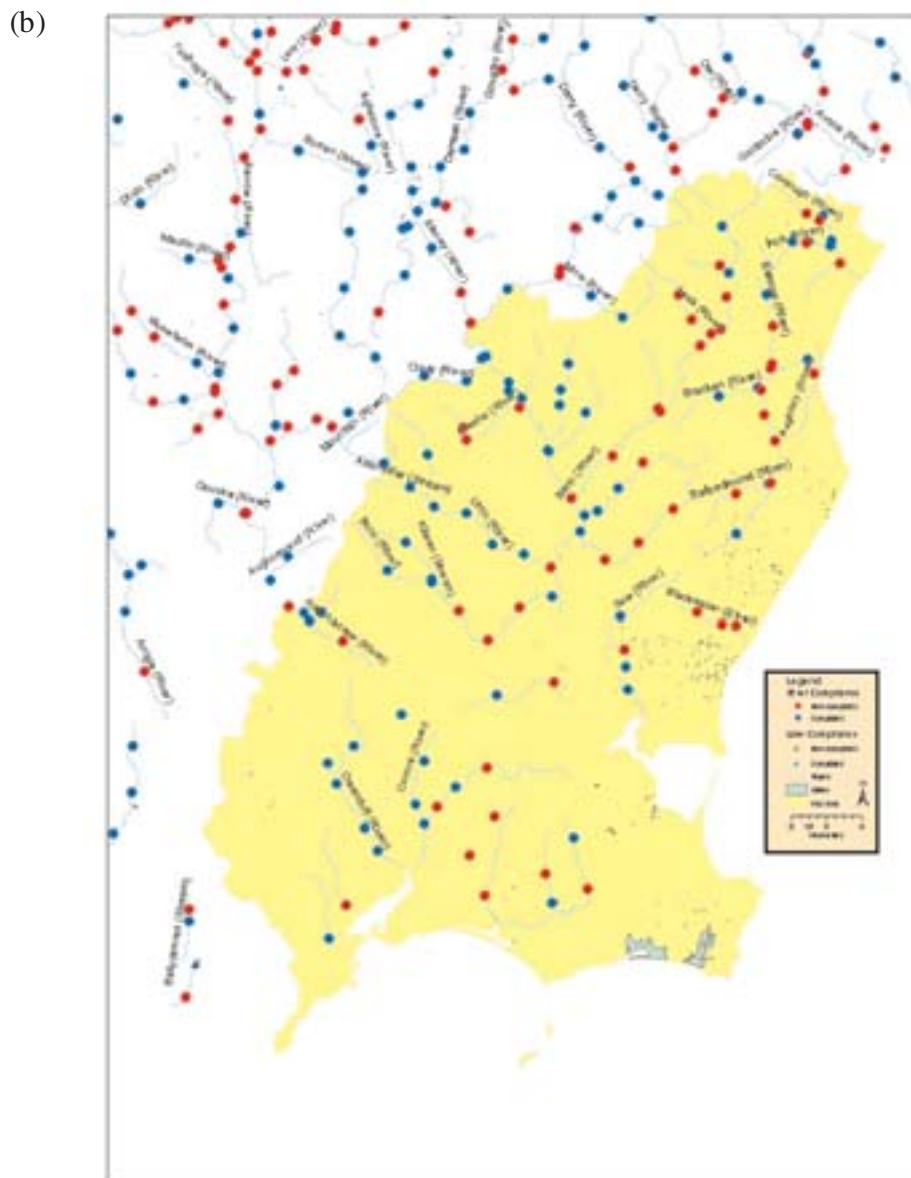
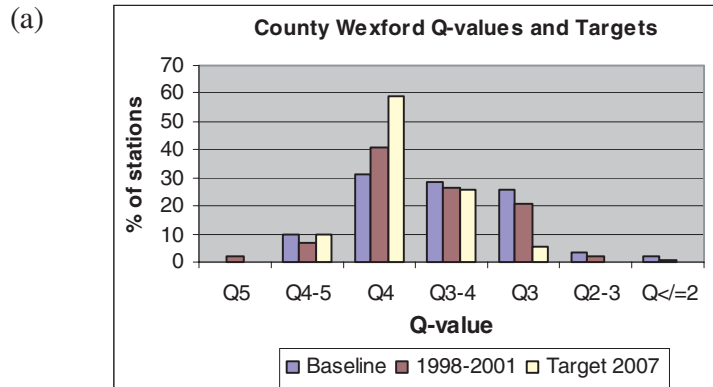


Figure 25(a) Trends in biological water quality; (b) River compliance with Phosphorus Regulations in Wexford.

Wicklow County Council

SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in water quality with 67.9 per cent of stations currently of satisfactory quality compared to 75.0 per cent in the baseline survey.
- Of stations monitored in 1998-2002, 50.9 per cent comply with the standards set in the Regulations, down 6.3 per cent from the last report.
- 50.9 per cent of stations meet the biological targets of the Regulations, down 6.3 per cent from the last report.
- The number of high quality Q5 stations has decreased from 16 in the baseline survey to 7 currently. In addition, the number of Q4-5 stations has decreased from 34 in the baseline survey to 29 currently.
- There are 9 lakes in the county that fall under the Regulations, 8 of these were recently monitored and 2 are not compliant (the Vartry and Golden Falls Reservoirs).

PROGRESS IN MEASURES BEING IMPLEMENTED

- WWTPs monitored 3-5 times/year.
- WWTPs recently upgraded include Kirikee, Redcross, Aughrim, Tinahely and Shillelagh.
- Funding (€635K) secured from DEHLG for upgrading WWTPs and sewer mains infrastructure.
- Since 2000, 11 new Section 4 licences issued and 3 reviewed. One Section 4 licence reviewed, two under review. (53 Section 4 and 8 Section 16 licences issued in total.)
- Agri-consultant appointed in December 2002 to implement farm surveys, nutrient management planning etc.
- Sludge Management Plan prepared.
- Enforcement of Water Pollution Act - since 1999 Council has issued 11 Section 12 Notices, 4 Section 3 Notices and 2 Section 4 Notices.
- Liaison with farming organisations, Teagasc, Coillte, Forest Service and Fisheries Boards.
- Consultation with Coillte on aerial fertilisation or pesticide programmes.
- Environmental education promoted through website, presentations to farmers, Environmental Education Officer etc.
- Council monitors 95 river stations.
- Planning control on septic tanks to improve their operation through compulsory maintenance clauses.

ADDITIONAL MEASURES PROPOSED

- Encourage the application of Best Farm Management Practices including appropriate storage of farm wastes and nutrient management planning. Promote REPS.
- Carry out pilot farm surveys in Potters River catchment to develop methodology in 2003.
- Utilise Catchment Envisage system.
- Water quality report to be published annually.
- Encourage the screening of storm overflows and discharges and the use of storage impoundments and treatment systems for dirty water effluents.
- WWTPs to be upgraded with P removal in next 3 years include Roundwater, Blessington, Rathdrum, Dunlavin, Laragh and Avoca. A further 9 WWTPs to be upgraded but not with P removal.
- Review carried out of surface and foul water sewer network of 16 schemes, 4 to be upgraded at Ballyknockan, Ballycoogue, Dunlavin and Rathdangan.
- Establish Steering Group to implement Regulations.
- Expand river and lake monitoring programmes.
- Wicklow County Council has drawn up a draft Groundwater Protection Scheme for the county in conjunction with the Geological Survey of Ireland. Three public supply wells are subject to source protection.
- Participation in Eastern and South Eastern River Basin Management Systems.
- Review section 4 and 16 discharge licences.
- Review all water abstractions.
- Review licensed landspreading.

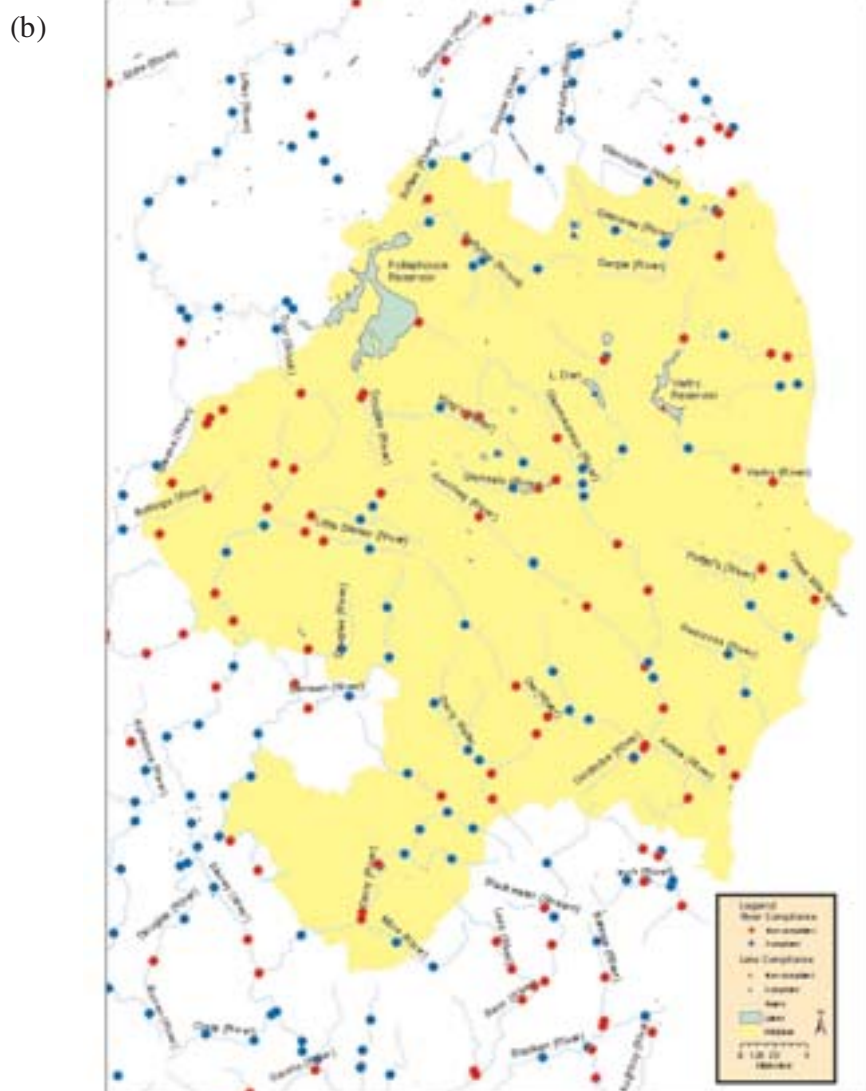
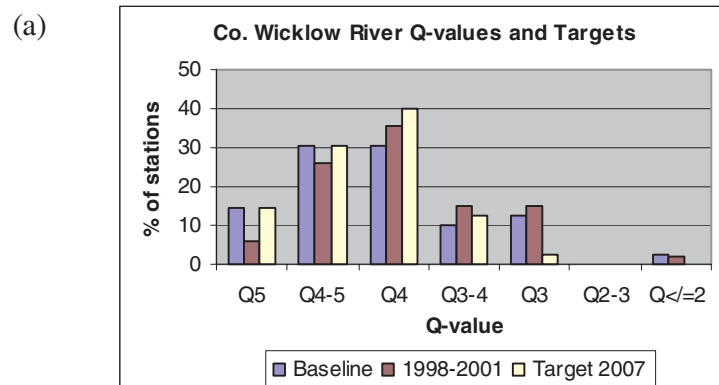


Figure 26(a) Trends in biological water quality; (b) River and Lake Compliance with Phosphorus Regulations in County Wicklow

An Gníomhaireacht um Chaomhnú Comhshaoil

Bunú

Achtaíodh an tAcht fán nGníomhaireacht um Chaomhnú Comhshaoil ar an 23ú lá d'Aibreán, 1992 agus faoin reachtaíocht seo bunaíodh an Gníomhaireacht go hoifigiúil ar an 26ú lá d'Iúil, 1993.

Cúraimí

Tá réimse leathan de dhualgais reachtúla ar an nGníomhaireacht agus de chumhachtaí reachtúla aici faoin Acht. Tá na nithe seo a leanas san áireamh i bpríomhfhreagrachtaí na Gníomhaireachta:

- ceadúnú agus rialáil próiseas mór/ilchasta tionsclaíoch agus próiseas eile a d'fhéadfadh a bheith an-truailitheach, ar bhonn rialú comhtháite ar thruailliú (Integrated Pollution Control-IPC) agus cur chun feidhme na dteicneolaíochtaí is fearr atá ar fáil chun na críche sin;
- faireachán a dhéanamh ar cháilíocht comhshaoil, lena n-áirítear bunachair sonraí a chur ar bun a mbeidh rochtain ag an bpobal orthu, agus foilsiú tuarascálacha treimhsiúla ar staid an chomhshaoil;
- comhairle a chur ar údarais phoiblí maidir le feidhmeanna comhshaoil agus cuidiú le húdarais áitiúla a bhfeidhmeannas caomhnaithe a chomhlíonadh;
- cleachtais atá fónta ó thaobh an chomhshaoil de a chur chun cinn, mar shampla, trí úsáid iniúchtaí comhshaoil a spreagadh, cuspóirí cáilíochta comhshaoil a leagan síos agus cóid chleachtais a eisiúint maidir le nithe a théann i bhfeidhm ar an gcomhshaoil;
- taighde comhshaoil a chur chun cinn agus a chomhordú;
- gach gníomhaíocht thábhachtach diúscairthe agus aisghabhála dramhaíola, lena n-áirítear líontaí talún, a cheadúnú agus a rialáil agus plean náisiúnta bainistíochta um dhramháil ghuaiseach, a bheidh le cur i ngníomh ag comhlachtaí eile, a ullmhú agus a thabhairt cothrom le dáta go tréimhsiúil;
- córas a fheidhmiú a chuirfidh ar ár gcumas astúcháin COS (Comhdhúiligh Orgánacha Sho-ghalaithe) a rialú de bharr cáinníochtaí suntasacha peitрил a bheith á stóráil i dteirminéil;
- na rialúcháin OMG (Orgánaigh a Mionathraíodh go Géiniteach) a fheidhmiú agus a ghníomhú maidir le húseaid shrianta a leithéad seo d'orgánaigh agus iad a scaoileadh d'aon turas isteach sa timpeallacht;

- clár hidriméadach náisiúnta a ullmhú agus a chur i ngníomh chun faisnéis maidir le leibhéil, toirteanna agus sruthanna uisce in aibhneacha, i lochanna agus i screamhuiscí a bhailiú, a anailisiú agus a fhoilsiú; agus
- maoirseacht i gcoitinne a dhéanamh ar chomhlíonadh a bhfeidhmeanna reachtúla caomhnaithe comhshaoil ag údarás áitiúla.

Stádas

Is eagrais poiblí neamhspleách í an Gníomhaireacht. Is í an Roinn Comhshaoil agus Rialtais Áitiúil an coimisceoir rialtais atá aici. Cinntítear a neamhspleáchas trí na modhanna a úsáidtear chun an tArd-Stiúrthóir agus na Stiúrthóirí a roghnú, agus tríd an tsaoirse a dhearbhaíonn an reachtaíocht di gníomhú ar a conlán féin. Tá freagracht dhíreach faoin reachtaíocht aici as réimse leathan feidhmeannas agus cuireann sé seo taca breise lena neamhspleáchas. Faoin reachtaíocht, is coir é iarracht a dhéanamh dul i gcion go míchuí ar an nGníomhaireacht nó ar aon duine atá ag gníomhú thar a ceann.

Eagrú

Tá ceanncheathrú na Gníomhaireachta lonnaithe i Loch Garman agus tá cúig fhoireann chigireachta aici, atá lonnaithe i mBaile Átha Cliath, Corcaigh, Cill Chainnigh, Caisleán an Bharraigh agus Muineachán.

Bainistíocht

Riarann Bord Feidhmiúcháin lánaimseartha an Gníomhaireacht. Tá Ard-Stiúrthóir agus ceathrar Stiúrthóirí ar an mBord. Ceapann an Rialtas an Bord Feidhmiúcháin de réir mionrialacha atá leagtha síos san Acht.

Coiste Comhairleach

Tugann Coiste Comhairleach ar a bhfuil dáréag ball cunamh don Gníomhaireacht. Ceapann an tAire Comhshaoil agus Rialtais Áitiúil na baill agus roghnaítear iad, den chuid is mó, ó dhaoine a ainmníonn eagraíochtaí a bhfuil suim acu i gcúrsaí comhshaoil nó forbartha. Tá réimse fairsing feidhmeannas comhairleach ag an gCoiste faoin Acht, i leith na Gníomhaireachta agus i leith an Aire araon.



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